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# The London ATALANTA

THE NEWSLETTER OF THE LNHS ECOLOGY & ENTOMOLOGY SECTION - No.16 October 1989

## WITH CAMERA TO THE CARIBBEAN

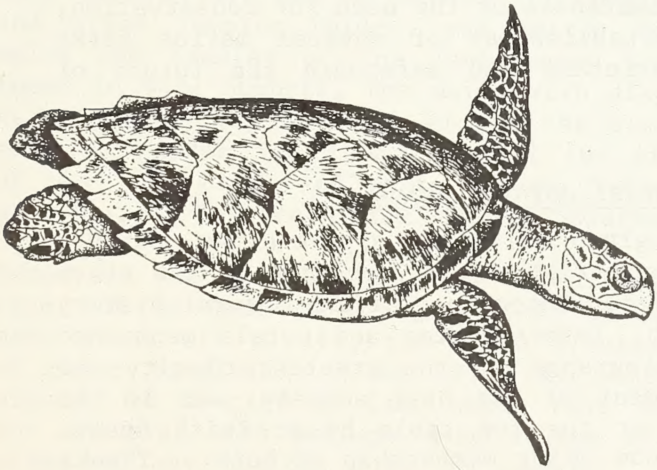
### Scuba diving for wildlife in the Cayman Islands

LINDA PITKIN

British Museum (Natural History)

The Cayman Islands, lying south of Cuba, are one of the finest areas for coral reefs in the Caribbean. Tourism draws more than 50,000 divers and snorkellers a year to Grand Cayman, the largest and most commercialised of the three islands; but far fewer venture to the small and unspoilt Little Cayman and Cayman Brac, which I visited to dive and photograph the spectacular life of the sea.

The reefs of the Cayman Islands provide two main types of site for diving: shallow, flattish areas and deep, sub-marine walls. Shallow reefs down to about 40 feet are dominated by large outcrops of stony corals, often with shoals of colourful reef fish in attendance. The walls, steep drops like underwater cliffs, start at about 60 feet down off Cayman Brac and Little Cayman, and are more accessible than at Grand Cayman where they are at least 100 feet deep. Cayman underwater walls are characterised by a strikingly different fauna from that of the shallow sites: in particular, clusters of large brown or bright yellow tube sponges and big, open-water fish such as barracuda, manta and eagle rays, and the occasional turtle. Interesting sponges are a feature of the Caymans: some appearing fragile such as the pink vase sponge, others massive like the giant barrel sponge, which is big enough for a diver to sit in and provides shelter for fish and invertebrates in variety.



The gorgonians or horny corals, few and far between on many other tropical reefs, are abundant in the Caribbean. The many species include diverse growth forms, ranging from those with widely spaced branches, straight or tangled, to others having a fine network of tiny branches fused in one plane. Of these, the sea-fans appear as delicate as lacework but are sufficiently pliable to withstand the action of the waves. Corals consist of colonies of tiny polyps which secrete, in the case of the main reef builders, the true or stony corals, a rigid skeleton. The Acropora corals, particularly elkhorn, a species with massive antler-like branches, are common enough to form characteristic zones on shallow reefs. They develop rapidly and become the dominant species in an area by outgrowing and overshadowing their competitors.

At night the reefs become alive with a whole new set of animals, mainly invertebrates. During the day in the Caribbean few crustaceans are to be seen, but many venture out to feed at night, including the brilliantly coloured red night shrimp, the tiny red hermit crab and the king crab, the largest of the Caribbean spider crabs, weighing up to eight pounds. Octopuses are able to vary their colour from red to blue, even white, and are active on the reef by night; as is another, very different, mollusc - the flamingo tongue snail. This avid predator feeds on the colourful sea-fans and has a mantle patterned with startling black-ringed orange blotches, extending over the shell. Tube worms can be found day and night, their feathery tentacles fully extended to filter micro-organisms from the water. They are highly sensitive to changes in light and movement and retract instantly into their tubes if disturbed.

Fish in these waters are most prevalent during the day, notably the big groupers which are abundant and very approachable. Nassau groupers, at about two feet in length, are among the smaller species, and having come to associate divers with food they tend to follow. The biggest of the groupers is the jew fish, built like a tank and weighing up to 700 lbs. More timid than groupers, the laterally compressed angel fish of several species usually swim in pairs; while the handsomely striped yellow and silver grunts - so named because of their alleged ability to emit sounds - gather in large shoals, often sheltering in the lee of elkhorn corals. Without doubt one of the most impressive fish is the great barracuda, up to six feet in length with well developed canine and shearing teeth in long, powerful jaws. The barracuda's bad reputation with divers is largely undeserved, for although inquisitive and liable to snap at bright objects they seldom attack.

There are five species of turtles in the Caribbean but their numbers have been greatly reduced by commercial exploitation, and although the turtle is used as a symbol to promote tourism in the islands all are uncommon. There is now a developing awareness of the need for conservation, and it is to be hoped that the establishment of several marine parks around Cayman Brac will help to maintain and safeguard the future of the coral reefs and their inhabitants.

## The LNHS/BENHS Annual Joint Meeting

Linda Pitkin's illustrated talk was given before an appreciative audience on September 14th at 74 South Audley Street on the occasion of the sixth joint meeting of the LNHS and the British Entomological and Natural History Society. All the species of fish, invertebrates and corals mentioned in the transcript were seen in photographs of the greatest clarity and beauty. Mrs Frances Murphy, President of the host society, was in the chair and the LNHS was represented at the top table by Mr Keith Hyatt. A number of members of each society now enjoy membership of both. Thanks were expressed on behalf of the LNHS and we look forward to hosting the Joint Meeting at Burlington House in 1990.

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# SPIDERS IN MAY

## A field excursion to Bostall Heath, London Borough of Greenwich

J. Edward Milner

The LNHS field meeting on Bostall Heath last December (see TLA No.13, p.52) produced spiders of 25 species from 7 Families; mostly widespread, all-year and winter-active species. The return visit was on one of the warmest and sunniest days of this year's remarkable month of May. Like certain spiders, it seems that spider-hunting LNHS members are also predominantly winter-active creatures, as attendance in May was only half that in December! However, the writer and three lady members did make it to the Heath on Sunday morning 20th May to start what proved to be a most rewarding spider hunt.

We began at the south-east corner of the Heath on one of the very few patches of *Calluna vulgaris* remaining. It is only a few square meters in extent but we found it to be teeming with spiders. Most of them were adults and young of the ubiquitous *Enoplognatha ovata*, predominantly white or pale yellow and occasionally with two pinkish-red stripes down the length of the abdomen. But other species were also in the heather: two sub-adult *Episinus* sp., probably *angulatus* - new to London; a male *Alopecosa pulverulenta* and a female *Pisaura mirabilis*, as well as some Linyphiids.

The vegetation on the south-east corner of the Heath is mainly gorse, birch and oak, with acid grassland on gravelly and sandy soil between. The bushes and lower branches of the trees were beaten and swept, grass and other vegetation sorted and shaken. The bark of pines and other trees was examined, and the grass on and around anthills searched. No *Atypus affinis* were seen, although the habitat is suitable; there are still no recent records of it for the County of London, although it was known before the Second World War from both Hampstead Heath and Wimbledon Common/Putney Heath. The curious Bird-dropping Spider *Cyclosa conica* was also missing although this was one of our 'target species', since it is known from Lesnes Abbey Woods just across the road.

During the day 50 species - from 17 Families - were found, only 13 of which had figured in the December list. In addition to *E. angulatus* four others were new to London: (1) *Heliophanus cupreus*, a beautiful black and green Jumping Spider, was beaten from the low vegetation; (2) both males and females of the long-legged Crab Spider *Philodromus dispar* were found in some numbers, the males with disc-shaped palps like tiny ping-pong bats; (3) on the bark of an oak the black Linyphiid *Moebilia penicillata;* and (4), under the loose bark of the pine trees, both males and females of the rare black and white Jumping Spider *Salticus zebraneus*, categorised as a Notable Species by the Nature Conservancy Council.

Comparing the December and May lists, the proportion of Linyphiids changed from 64% in December to just 34%; almost the same number of Linyphiids were found (17 to 16), the extra species being the mostly larger spiders of other Families. The five new London records, and a total for the site of 68 species so far, shows that Bostall Heath is a very good place for spiders, with perhaps more relics of the original fauna than at most sites of any habitat type in London. It can confidently be predicted that with further collecting the species list for the Heath will exceed a hundred.

A complete list of spiders and one false scorpion from Bostall Heath is given below, compiled from visits on 12 February, 16 April, 13 November and 4 December, 1988; and 20 May,1989. N = Notable Species.

New records for the County of London are marked *

AMAUROBIIDAE
- Amaurobius similis
- Amaurobius ferox

DICTYNIDAE
- Dictyna uncinata

OONOPIDAE
- Oonops pulcher
- Oonops domesticus

DYSDERIDAE
- Harpactea hombergi

GNAPHOSIDAE
- Drassodes lapidosus
- Zelotes latreillei

CLUBIONIDAE
- Clubiona terrestris
- Clubiona neglecta

ZORIDAE
- Zora spinimana

THOMISIDAE
- Xysticus cristatus

PHILODROMIDAE
- *Philodromus dispar
- Philodromus aureolus

SALTICIDAE
- N*Salticus zebraneus
- *Heliophanus cupreus
- Euophrys frontalis

LYCOSIDAE
- Pardosa pullata
- Alopecosa pulverulenta
- Trochosa terricola

EUSPARASSIDAE
- Pisaura mirabilis

AGALENIDAE
- Tegenaria sylvestris
- Hahnia montana

MIMETIDAE
- Ero furcata

THERIDIIDAE
- *Episinus sp.prob. angulatus
- Anelosimus vittatus
- Theridion sisyphium
- Theridion varians
- Theridion mystaceum
- Theridion tinctum
- Theridion bimaculatum
- Enoplognatha ovata
- Robertus lividus

TETRAGNATHIDAE
- Tetragnatha extensa
- Pachygnatha degeeri

METIDAE
- Metellina mengei

ARANEIDAE
- Araneus diadematus
- Araniella cucurbitina

LINYPHIIDAE (ERIGONINAE)
- Walckenaeria antica
- *Moebelia penicillata
- Gongylidium rufipes
- Dismodicus bifrons
- Tiso vagans
- *Troxochrus scabriculus
- Monocephalus fuscipes
- Micrargus herbigradus
- Savignya frontata
- Diplocephalus latifron
- Diplocephalus picinus

LINYPHIIDAE (LINYPHIINAE)
- *Agyneta decora
- Microneta viaria
- Centromerus dilutus
- Centromerita concinna
- Macrargus rufus
- Bathyphantes gracilis
- Labulla thoracica
- Stemonyphantes lineatu
- Lepthyphantes minutus
- Lepthyphantes obscurus
- Lepthyphantes tenuis
- Lepthyphantes zimmerma
- Lepthyphantes mengei
- Lepthyphantes flavipes
- Lepthyphantes ericaeus
- Linyphia triangularis
- Linyphia hortensis
- Linyphia clathrata
- Linyphia peltata

PSEUDOSCORPIONES
- Roncus lubricus

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The drawing of a turtle on p.61 is by Linda Pitkin

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THE NEWSLETTER OF THE LNHS ECOLOGY & ENTOMOLOGY SECTION - No.17 January 1990

# A NATURALIST IN NEW ZEALAND

Dr ADRIAN R. PLANT*

A lecture at Burlington House, Piccadilly, on 16th October, 1989

The remote islands of New Zealand lie some 1500 miles to the south-east of Australia, surrounded by the vast Pacific and Southern Oceans. About 120 million years ago, at the end of the Jurassic period, the land which would eventually become New Zealand separated from the primeval Gondwana supercontinent, and carried with it elements of the Jurassic flora and fauna. These have evolved in isolation, untouched by the many developments which have so influenced the biota of the rest of the world. The break-up of Gondwana pre-dated by millions of years the appearance of flowering plants and the great diversification of mammals world-wide, and today in New Zealand endemic land mammals are lacking and there is an impoverished flora of angiosperms.

From the Kermadec Islands in the north to the Auckland Islands in the south, the climate varies from sub-tropical to sub-Atlantic and contributes to a great diversity of habitats. Much of the original climax forest of podocarp or southern beech on the main islands has been cleared to make way for agriculture. Now only some 10% of the land remains under forest, with tussock grasslands in the upland areas.

Plants and animals living on islands are particularly prone to extinction. The reasons for this are complex, but in New Zealand the major factor has been the colonisation of the larger islands by man and his introduction of alien animals. This began with the Polynesians 1000 years ago and has been accelerated in the last two centuries by European colonisation and exploitation. New Zealand has one of the highest rates of extinction in the world, and a very high proportion of the surviving species are critically endangered. Such birds as the kokako, kakapo, shore plover, black robin, takahe, stitchbird and saddleback, for example, have survived only as a result of intensive conservation and management.

Factors in the decline of many species of plants and animals have been the wholesale destruction of habitat and the ravages of the predators and herbivores brought in misguidedly by man. Many of New Zealand's endemic birds were ground dwelling and flightless, and stood little chance against such unwelcome introductions as rats and the cats and stoats brought in to control them. The Polynesian rat arrived with the first Maori colonists, and was largely responsible for the extinction of some spectacular large beetles and other invertebrates. Relentless browsing

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by deer, pigs and herbivorous brush-tailed 'possums has had drastic effects on the structure of the native forests.

Many previously abundant species of plants and animals are now restricted to predator-free offshore islands. Some of these are of international importance as breeding stations for such marine animals as Hooker's sealion and for more than fifty species of seabirds, including albatrosses, petrels and shearwaters.

Further reading:
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## CONSERVATION AND POLLARDING IN EPPING FOREST

### Some Aspects of Forest Management

On 14th October 1989, a crisp, cool and sunny day, our field meeting party was privileged to be conducted to some sites of particular interest on the Forest by the Superintendent, Mr John Besent. Epping Forest is an ancient woodland of 6800 acres to the north-east of London, extending from Leytonstone in the south to Epping in the north. Like other woodlands around London, it was well on the way at the end of the nineteenth century to vanishing for ever. The defence by the City Corporation of the commoners' grazing rights against the enclosures made by local landowners culminated in the Epping Forest Act of 1878. This appointed the City as Conservators with the duty, among others, to keep it unenclosed as an open space for the recreation and enjoyment of the public.

We started at the Warren, Loughton, the administrative headquarters of the Superintendent and his 58 staff. Dating from Tudor times, it was the Reindeer Inn during the eighteenth century and a private house in the nineteenth. It now has an office, cottages for Forest staff, garages, stabling and a sawmill. Timber is produced as a by-product of management work in the Forest and is cut to size for bridges and posts. Near the stable is a pond for convalescent waterfowl, fenced to keep out foxes.

We then packed into the Forest minibus and were driven to Hangboy Slade, a glade which had become very overgrown by the lack of grazing but which has now been restored by cutting back the undergrowth and pollarding some of the trees. Apart from the commoners' animals, the Forest used to be grazed by a herd of 'black' fallow deer. It is not known how these came by their distinctive, very dark brown coats and in 1878 they had been almost shot out, the population being down to 12 does and one buck. These days, the deer find the Forest too disturbed for their liking and seldom venture in. There are 70-80 at the deer sanctuary at Theydon Bois and another breeding herd is at Whipsnade zoo.

By 1971 the amount of horse-riding was beginning to cause damage and the Conservators gained powers to prohibit it where necessary. Since then, 20 miles of rides have been laid down. These let in more light, provide more 'woodland edge' and are appreciated by walkers as well as riders. The 1878 Act stopped all wood extraction, including pollarding, and the original management aim was to restore the woodland to high forest. Oak and hornbeam dominate the more fertile areas and beech the poorer soil. We saw no sycamore and were told it is only a problem in a few outlying sites. Originally, the old pollard stools were left with two or more shoots to grow into pseudo-trunks. The resulting tall trees have been thinned to let in light and encourage natural regeneration. The NCC, however, are keen to retain many of the old pollards for as long as possible, since the hollows formed between the multiple trunks provide a unique habitat. Where regeneration is at risk because of shading by these old trees, it has been suggested that they should be re-pollarded rather than felled. This has been successful with oak and hornbeam; the beech has usually died unless pollarded in stages.

The glade, Furzeground, had been completely invaded by silver birch. This was cleared away six years ago and has been kept clear by local conservation volunteers. Bracken regrowth is now less vigorous and the red-tipped heathland lichen *Cladonia floerkeana* has appeared. Many of the Forest ponds are former gravel pits. This is true of Goldings Hill Pond, where more light and air has been let in by felling marginal trees, especially at the south. As the Forest ponds are wonderful dragonfly habitat, I was delighted to hear that the Management Plan calls for the restoration of one major pond each year.

The rare moss *Leucobryum glaucum* occurs in several places in Epping Forest. Watson (1981) says of it that it is a moss so completely unlike any other British species that it can be recognised not only with the naked eye but at a distance. It has two principal habitats: (1) on the woodland floor under beech, oak or conifers, and (2) in wet moorland situations; both habitats being strongly acid. We saw many cushions of it on our way to Loughton Camp, a circular ditch and bank, which is an ancient British earthwork. The NCC are in favour of leaving the old beech pollards which have grown all over it. Others do not agree and would like them cleared; but clear felling, in the absence of grazing, creates the further management problem of the resultant bramble and scrub.

Contra to the general policy of management since the early 1980s, in several selected non-intervention areas Nature is allowed to go her own way. Little Monks Wood and Great Monks Wood, for example, are close to impenetrable and quite unlike the areas where pollarded trees in various stages of growth are an essential feature of the Forest and contribute to its distinctive character. Our grateful thanks are due to Mr Besent for his valued commentary, and for his kindness in transporting us about the Forest and back to the station. Ruth Day.

## References

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Moxey, Paul 1985. Epping Forest - the ecology and future of an ancient woodland. E. & E. Section Reprint, available on request.
Qvist, Alfred 1971. Epping forest. Corporation of London. Obtainable from the Public Relations Office at the Guildhall; price 50p.
Watson, E.V. 1981. British Mosses and Liverworts. C.U.P.

The Epping Forest Map may be ordered from: The Superintendent, The Warren, Loughton, IG10 4RW. Price: £2.50 + p. & p. 50p.

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A photograph by J.R.Laundon of pollarded hornbeams in Epping Forest is is in The London Naturalist No.59, facing page 8.

## An unexpected Orthoptera record

Whilst working in the garden of a private house on Kingston Hill, Surrey, (tetrad reference 27T00) on 15th August, 1989 Mr Peter Mills unearthed a Mole Cricket *Gryllotalpa gryllotalpa*. The insect was identified and recorded by Mr Andrew Harvey who explained that the garden contained many plants from southern Europe and speculated not unreasonably that it may have been introduced with them. Marshall and Hayes (1988) note that single specimens occurring in built up areas are likely to be introductions. Paul (1989) states that in some countries the species is a pest and may be imported with root vegetables.

It is not possible to establish at which stage of its life cycle the insect may have been imported. The female exercises considerable parental care at egg stage and this is probably essential to development. An adult insect is large (46mm long) and conspicuous. The specimen, which was adult and appeared healthy, may have been imported in one of the less obvious nymphal stages. The Mole Cricket is considered near to extinction in Great Britain. The survival of accidental imports such as this makes re-introduction an interesting possibility. I am grateful to Mr Andrew Harvey for details of this record.

D.S.Martin, LNHS Recorder for the Orthoptera
121 Devonshire Road, Hornchurch, Essex, RM12 4LP.

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## Annual General Meeting of E. & E. Section 13th November 1989

### Extract from the Secretary's Report

In January, 1989 the Bookham Survey again became part of E. & E. Section. This has been seen as a welcome and logical step, for the work being done at Bookham is very much in accord with the objectives of E. & E., and indeed the Survey was begun by Ecology Section in 1942. With the passage of time the reasons for the separation have become misted over and obsolete, and the need for re-unification has for long been apparent. Dr Geoffrey Beven and Mr Ken Page continue as Chairman and Secretary of the Bookham Sub-Committee. By arrangement with the National Trust, a new survey hut was erected on the Common by the Society in 1989. This has the benefit of electric lighting and heating, furniture and books. The second Sunday of each month continues to see the assembly at Bookham of an enthusiastic band of regulars, following up various lines of enquiry and deriving much pleasure and satisfaction from working in the field as a team. The facilities at Bookham are available to all members on the advertised dates and at other times by arrangement. Newcomers are always welcome.

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## THE GEOLOGY AND NATURAL HISTORY OF HAMPSTEAD HEATH

RAY SOFTLY*

A lecture at Burlington House, Piccadilly, on 20th February, 1990

The North London heights, at Hampstead and Highgate, provide an island of countryside within the heart of London, and are the remnants of Eocene deposits of silts and gravels topped with a deep layer of sand. The whole plain of London clay, filling the downfold of the chalk that now outcrops as the Chilterns and the North Downs, must once have been covered by these successive layers of the Claygate Beds and Bagshot Sands. Across the plain meandered north-flowing rivers from their source in the range now reduced to the Wealden heights. These became tributaries of a Thames then running northeast through where Finchley and Clacton now stand, and their pebble gravels still remain as a few tiny patches lying on the Bagshot Sands. The then course of the Thames eroded this plain to the north until the Thames itself was diverted to its present course by the advancing ice sheets. The North London heights thus had their origin in the area between the two successive valleys of the Thames.

The sand capping gives Hampstead Heath much of its distinctive character, producing a permeable acid soil through which the rain freely drains to emerge as spring lines over the underlying clay. To the south these give rise to the headwaters of the River Fleet, and in the north drain into the Mutton Brook and thence to the Brent. The West, East and Sandy Heaths, of which the last named provided sand for the mortar of an expanding London, were once the common land of the local manorial waste. In 1871 the heaths came into public ownership by an act of Parliament which stated that it would be advantageous for the area to remain an open space for the benefit of Londoners. The tide of building was already lapping at its southern edges.

Such was the popular appeal of the Heath that it became the nucleus of further additions: the country estates of Golders Hill and of Kenwood, the pastures of Parliament Hill Fields and, to the northwest, the Heath Extension. This has culminated in a wide variety of habitats - some 800 acres of woodland, grassland, hedgerow, scrub and marsh, with numerous ponds and streams.

Of the woodland, much is secondary and comparatively recent, developed since the cessation of grazing. The North and South Woods of Kenwood are high forest, though with poor ground flora which has been limited, as has also natural tree regeneration, by the spread of rhododendron and laurel. These invasive species are being reduced by current management. The gales of recent years have resulted in a mass of fallen timber with little in the way of young trees to fill the gaps. The Nature Conservancy Council has recommended that this SSSI should be left largely untouched to see how it will develop naturally. Much fallen timber is indeed now left in situ as opposed to the traditional park concept of tidying it up.

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The woodlands are dominated by oak, beech or birch, according to area. The odd genuine wild crab apple survives, but does not seem to succeed in reproducing itself, and most of the apple bloom seen on the Heath derives from discarded apple cores. A few wild service trees have grown to maturity, and these indicators of ancient woodland have produced several younger trees. In most parts sycamore is a serious invader with its prolific production of seed. Hawthorns are found that had developed tall trunks as they grew with the surrounding trees, and are now dying off as the canopy closes over them.

There is a good tally of resident woodland birds, augmented by seasonal visitors. The woodland mammals had still included the Kenwood badgers when in 1913 the Hampstead Scientific Society published its survey of the natural history of the Heath. The polecat had but recently disappeared. The red squirrel was still there, but the grey had already arrived in its outward colonisation from Regent's Park. The rabbit, mole and hedgehog, together with shrews, voles and mice, are still with us; but it is curious that the fox, no doubt heavily persecuted around London, was not mentioned in 1913. It is resident now.

Little of the original heathland remains, it being now mainly under secondary woodland. Gorse survives only at the woodland edge. The few open sandy areas no longer suffice to provide adequate habitat for many typical heathland invertebrates, but solitary mining bees still occur in large numbers. In 1913 the sand lizard was said to be found on any sunny bank, but the only reptile now is the slow worm.

The springs of the Heath, appearing as rushy seepages, and the stream banks where not overshadowed by trees and shrubs, give rise to water mint, bur marigold, gipsywort, great hairy willowherb and other marsh plants. The ponds of the Sandy Heath are not spring fed but have developed in hollows of the old sand diggings, where an impervious ironpan has formed. These ponds have recently been rehabilitated by removal of years of leaf fall and by opening up the tree canopy. They remain the chief breeding area of the frog population. Other small ponds exist on the Heath Extension as a stream-fed chain created by dams, and these also have of late been re-excavated and now have good emergent vegetation. The two chains of much larger ponds, created long ago by dams along the twin stream valleys on the south face of the watershed, form the headwaters of the River Fleet, disappearing into culverts beyond the limits of the Heath. They are the breeding grounds of the toads, and also have a fish population that annually supports several pairs of great crested grebes, only recently a breeding bird there. Mallard and tufted duck nest, but their ducklings are preyed upon by pike below and by carrion crows above. Canada geese are present in increasing numbers and common terns, probably from the breeding pairs at the Brent Reservoir some four miles to the west, visit to feed. Dragonflies and damselflies breed, together with caddis and other aquatic insects which are a food source for bats.

A sphagnum bog which developed in the stream valley of the West Field at Kenwood has been rescued from invading birch, and is now completely cleared of trees and protected from trampling by a fence. The West Heath, too, has its bog, likewise invaded by trees, and this also is being opened up. It is dominated by purple moor grass and the reed-like great water grass, and at its edge is a solitary creeping willow.

The open meadows require careful management. They are part shortmown amenity grassland and sports pitches, part mown annually with removal of hay, part flailmown with cuttings left lying. The better drained areas have an acid grass heath community, with heath bedstraw and tormentil, and do actually develop peat, which in the drought of 1976 dried out and burned beneath the surface. Woody shrubs and tree seedlings invade any open area not regularly cut and this creates another, temporary, habitat which gives cover, together with the remaining hedges, for resident and summer resident breeding birds and a host of invertebrates.

Tall herb species abound in the wetter areas and in the long grass, and are food for larvae and nectar sources for adult insects. Over-large nettle beds have formed in places subjected to clandestine tipping of domestic rubbish in Victorian times. Such invasive alien species as Japanese knotweed, Californian brome and Himalayan balsam have presented a more urgent management problem than even the sycamore. Assisted by wet summers, the balsam has spread along the watercourses with great rapidity, obliterating the native fauna. Total extermination is the only realistic means of control and some areas have already been freed. Seeds can be carried unexpectedly on dogs and on clothing, to germinate far from their origin, and if one plant is allowed to flower and set seed there will be a hundred there the next year.

Hampstead Heath will remain subject to many forms of public pressure. It is now administered by the City of London Corporation, with the Kenwood area under the separate ownership of English Heritage. The City's management structure is, at least in theory, adequately representative of the various sections of public interest in the Heath. A management plan is in embryo to take account of the long-term requirements of the Heath. In spite of, or perhaps because of, all the problems the Heath complex faces, its varied habitats and communities well merit a continuity of observation and recording by the Society; a north-of-the-Thames counterpart perhaps of the long-running survey at Bookham.

Further reading:

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Softly, R.A. 'Some Hampstead Lepidoptera in 1987'. The London Atalanta No.8: 30-31.

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Ray Softly's sequel field meeting on 24th February was well attended, and afforded members the opportunity to see for themselves all the diverse habitats which make up this distinctive area. Beside the small bog fed by the springs of the Bagshot sands the silvery buds were breaking on the creeping willow on West Heath. Finely textured sand was to be seen among the roots of trees torn out by the gales, and the one remaining bilberry bush and patches of re-introduced heather were noted as we made our way to the high forest of Kenwood. Fresh sandy cavities beside the path had appeared overnight from the borings of the already active solitary mining bees, and by mid afternoon forty or more carrion crows were beginning to assemble at the roost in South Wood. Another field meeting is planned for 14th July to see the Heath in summer.

## PERSISTENCE, OPPORTUNISM AND TRANSLOCATION IN PLANTS

BRYAN RADCLIFFE

Since 1942 a survey of the biology of Bookham Common has been in progress and a number of botanical studies have been made. It might well be thought that after all this time there would be no new plants to be found, apart from the odd casual immigrant being with us for a season or two. That such a depressing conclusion was unfounded became evident last year when a new species, bullace (Prunus domestica ssp. insititia) was discovered. Clearly, this was no newcomer. Surrounding the main tree, its suckers or progeny dominated an area of at least fifty square metres.

Trees can survive for hundreds or even thousands of years but what about herbaceous plants? A long-term survey may reveal some surprising examples of persistence. At some unknown date a single plant of asparagus became established - whether deliberately planted or resulting from an adventitious seed we shall never know. It was first noticed in 1950 and is still present, so this individual is at least forty years old and possibly a great deal older.

Other species exhibit a somewhat different aspect of persistence. The adderstongue is thought to be comparatively short-lived as an individual. It is decidedly local on the Common, but where it does occur may be present in thousands when conditions are suitable. It can be seen in open grassland or the deep shade of mature scrub or trees. The areas it inhabits are known to be the same now as in 1953. A similar persistence is demonstrated by the wood sorrel. This is an abundant woodland species and in 1953 was recorded in 14 out of the 20 divisions of the Common. As might be expected, there have been considerable changes during the passage of 36 years, perhaps the most notable being the substantial increase in woodland. The wood sorrel has neither gained nor lost ground, and remains abundant in the same 14 divisions.

It is not surprising that opportunist annuals such as heath and sticky groundsels and black nightshade should move about as conditions alter. These three and many others were found in totally different divisions in the two major surveys. Curiously, a few seemingly sedentary perennials such as moschatel and anemone behaved similarly. With the exception of free-floating aquatics, individual plants do not move but it was clear when comparing results of the major surveys that there had been a great deal of translocation of species in the intervening period of about 25 years. This 'movement', though variable in direction with individual species, appeared to have a predominantly consistent pattern: from the more closed woodland areas of the north and east to the more open grass and scrub of the south and west.

In an attempt to develop this supposition on a more scientific basis, a mathematical treatment was devised whereby the centres of distribution of individual species could be calculated for the two surveys. A substantial group of species was selected for the calculations, the only criteria for selection being that the species were very common but not ubiquitous. If movement of species in the period had been random the resultant combined shift of centres could be expected to be nil or tending towards nil. However, the results of the calculations showed a very positive shift of more than 1.5 kilometres to the south-west.

The more we learn about the botany of Bookham the more questions arise. Ivy is abundant on the Common but why does it not occur everywhere? How is it that yew seedlings and saplings, commonly recorded in the Fifties and frequent still, rarely develop to maturity? These are just two of hundreds of questions that could be posed. They are not likely to be answered by a genius, but by someone who has the patience to make careful observations, the persistence to keep a project going for as long as it takes and, above all, an enquiring mind that is interested in finding out how Nature works. Expert or beginner, you could do valuable work at Bookham.

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The London
ATALANTA

THE NEWSLETTER OF THE LNHS ECOLOGY & ENTOMOLOGY SECTION - No.19 March 1991

# FINE BOOKS FOR GOOD NATURALISTS

BASIL HARLEY*

A lecture at Burlington House, Piccadilly, on 12th March, 1990

Illustrated natural history books have been of crucial importance for the study of all branches of zoology and botany and none more so than those on entomology. From the early eighteenth century there have been works of remarkable beauty as well as of amazing accuracy, many of which are now collectors' items and fetch huge sums in the antiquarian book market. The earliest illustrative work was engraved and hand coloured, as for example Merian, Sepp, Dutfield, Moses Harris and J. Edward Smith. Later, different techniques were employed, such as hand-coloured lithography, wood-block colour printing, process engraving and finally, as used today, photo-lithography, employing four-colour process separation.

A feature of early works was that species were illustrated in natural or semi-natural attitudes. Especially with the Lepidoptera, the life-history stages and foodplants were often depicted together. Later, as set specimens became more widely available for reference, colour plates tended to show the adults of the species aligned in rows for ease of comparison just as in a cabinet. Both traditions of illustration have survived but the more scientific works nowadays usually adopt the less decorative treatment.

My own interest in natural history and in book collecting began at about the age of nine, since when I have been an enthusiast in both fields. I still have all the natural history books I have ever bought, some of which I will be illustrating this evening. For example, in the 1940s I bought N.H.Joy's two-volume 'Practical Handbook of British Beetles' for three guineas, and I well remember my excitement on buying E.B.Ford's 'Butterflies' in the New Naturalist series for 16 shillings in 1945, when it was first published, and a beautiful six-volume, gilt-decorated set of F.O. Morris's 'British Birds' for four pounds around 1947.

My first involvement with the production of books came in 1964. The Curwen Press in Plaistow, east London, was especially skilled in the printing of fine letter-press text and by the 1970s we were producing illustrated books for such clients as the Royal Botanic Gardens, the Tryon Gallery, the Ray Society and a few large American customers. We also attempted a little publishing of our own, notably our series of wildlife calendars and, in 1969, 'The Short History of the Brown Tail Moth' - a facsimile of an early work by William Curtis. Following that, Eric Classey introduced me to Dick Dominick, an American amateur lepidopterist who had a great ambition to produce a work covering the whole North American Lepidoptera. We embarked on this for him, the first of innumerable parts appearing in 1971. That series continues to the present time but is now printed in the United States and published from the U.S. National Museum in Washington.

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At the end of 1971 John Heath approached us with a view to our publishing an equivalent work on British species - the work that became 'The Moths and Butterflies of Great Britain and Ireland'. It was a much bigger task than we had expected and the printing industry was, at that time, going through great convulsions. However, we managed to publish Volume 1 in 1976 and Volume 9 in 1979 with, in between, Cyril Hammond's 'The Dragonflies of Great Britain and Ireland'. Our publishing at Curwen came to an end when I left the company in 1982 and, with my wife Annette, started in 1983 our own publishing firm which came to be called Harley Books. We bought all rights in the Curwen volumes and took over the stock.

With no staff and a great deal of editorial, design, production and general financial matters to attend to, there is not much spare time. As we produce each title, we look back at some of the influential earlier works with which we feel we share a tradition. I propose to illustrate not only recent works but also those which preceded them, revealing the extent to which good books for the enquiring entomologist have become more comprehensive and more accessible.

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More than sixty famous books, together with a demonstration of the four-colour printing process, were illustrated by slides. A full list may be had from the editorial address on page 76; the following is a selection from the eighteenth and nineteenth Centuries:

| | | |
|---|---|---|
| *Metamorphosis Insectorum Surinamensium* | Maria Sibylla Merian | 1705 |
| *Natural History of Spiders and other Curious Insects* | Eleazor Albin | 1736 |
| *A New and Complete Natural History of English Moths and Butterflies* | James Dutfield | 1748 |
| *The Aurelian; a Natural History of English Moths and Butterflies* | Moses Harris | 1766 |
| *A History of the Spiders of Great Britain and Ireland* | John Blackwall | 1861 |
| *A History of British Butterflies* | Rev.F.O.Morris | 1864 |
| *European Moths and Butterflies* | W.F.Kirby | 1885 |
| *Synopsis of the British Orthoptera* | E. Eland Shaw | 1889-90 |
| *A Natural History of British Moths* | Rev. F.O.Morris | 1891 |
| *British Orthoptera* | Malcolm Burr | 1897 |
| *British Dragonflies* | W.J.Lucas | 1900 |

# TROPICAL FOREST CONSERVATION
## and some spectacular dragonflies
## in COSTA RICA

STEPHEN BROOKS*

A lecture at Burlington House on 15th October, 1990

I visited Costa Rica in June-July, 1988 and May-June, 1990 to study and collect dragonflies. The trips were part of a collaborative project with a Costa Rican odonatologist to produce a popular field guide to the dragonflies of the region. This is one of several projects in which the Entomology Department of the Natural History Museum, London is currently engaged in Costa Rica. The overall goal of this venture is to produce revisionary studies and popular field guides to the major Costa Rican insect groups, to provide expert assistance in establishing a large natural history museum near the capital, San Jose, and to provide training for Costa Rican taxonomists.

This small Central American country, about the size of Wales, is situated between Nicauragua and Panama. It has a typical tropical climate with a dry season between December and May. On the Pacific side there is seasonal dry forest. Down the centre of the country runs a chain of mountains of volcanic origin which supports a lush rain- and cloud-forest vegetation. On the Atlantic coast, in the east, there are mangrove swamps.

Costa Rica is unusual, when compared with other Latin American countries, in that it has had a well-established democracy for over a hundred years and has no standing army. This has meant that extra money has been available to spend on health care (many of the tropical diseases which are rife in neighbouring countries have been eradicated in Costa Rica) and education, with a resulting high rate of literacy. Another priority is conservation and about one fifth of the country has been designated as national parks. However, much of the rest has been turned over to cattle ranching, coffee and banana production. Logging and clearance of the remaining forest by uncontrolled burning are still prevalent and the forest is by no means safe. The Costa Rican government is aware that the only way to protect the forest is by encouraging the people to value it. Unlike Europe, there is no natural history tradition in Costa Rica. There are no Spanish field guides to the flora and fauna and those few which are available in English are too expensive for most residents. In order to address these problems the Government has invested large resources into the establishment of the natural history museum, and encourages collaborative studies with biologists from the developed world.

A central figure in this effort is Dan Janzen, an American biologist, who works for much of his time in Guanacaste National Park, north-west Costa Rica. Here is preserved the last remaining large tracts of tropical dry forest. The park also includes two volcanoes which support extensive stands of rain-forest and, toward their peaks, a stunted, wind-swept cloud-forest. Janzen has been able to increase the size of the Park by buying out local ranchers using a debt swap system and money raised from conservation organisations abroad. The ranchers are not dispossessed but given the option of staying in their homes and working as Rangers in the Park, where their local knowledge is of much practical value.

I first became involved in the project when Dan Janzen asked me to visit Guanacaste and begin a survey of the dragonflies. Costa Rica has a rich dragonfly fauna and, compared with the rest of the neotropics, has been well studied. About 250 species are currently known from the country, including many endemics, compared with about 130 for the whole of Europe. During the month I spent on the 700 $km^2$ park I collected nearly 90 species, of which five were previously undescribed.

The dry forest (350m), with its temporary pools and rivers, supports a fauna dominated by libellulids. Most of the species that I encountered are widespread throughout Central America and probably arrive soon after the rains begin. Some of them, such as *Tramea* spp. and *Pantala flavescens*, the Globe Skimmer, are particularly well adapted to colonising temporary habitats and the larvae are able to rapidly complete their development. Several times I saw these species ovipositing in the puddles formed in tyre tracks. In the denser parts of the dry forest *Acanthagyna* spp, which have massive eyes to help them locate their prey in low light levels, can be seen flying even at dusk or in the first light of dawn.

The forests on the volcanoes (680m) harbour a far less mobile fauna. Here the shady, trickling streams are the home of cryptically coloured damselflies such as *Philogenia* and *Heteragrion*, and skulking gomphid dragonflies like *Epigomphus* spp. Such species are often black, with bright yellow or blue patches towards the tip of the abdomen, or stripes across the front of the face, which are displayed to attract mates or ward off rivals in the forest gloom. Unlike the species which inhabit open sunny biotopes, the forest species fly only reluctantly and must be sought out by carefully looking at the tips of overhanging branches and leaves. Typical of larger forest streams with a broken tree canopy are the calopterygid damselflies, *Hetaerina*. They are frequently seen perching on sunlit leaves overhanging streams, and are characterised by a vivid red patch at the base of the wings. At the edge of the forest, in pools and marshy seepages, is yet another fauna which includes many species of blue damselflies of the large and taxonomically complex genus *Argia*.

It is away from water, in sunlit forest clearings, that the spectacular pseudostigmatid damselflies are encountered. This family includes the world's largest odonate, *Megaloprepus caerulatus*, which has a wing-span of over eight inches. It breeds in water-filled tree holes and the males are often seen guarding a suitable site in a fallen tree. The very long, narrow abdomen enables the female to oviposit without damaging its wings. *M. caerulatus* has the apical half of the wings marked with a broad, inky-blue stripe and an opalescent stripe inside this. In other, related species the wing-tips are marked with a yellow or white spot. These markings are remarkably iridescent in the tropical sunshine. Pseudostigmatids are also known as 'helicopter' damselflies because of the way their wings beat in a circular motion, independently of each other, as they hover and slowly glide through the dappled forest clearings. They specialise in feeding on orb spiders, which they pluck from the centre of their webs.

Costa Rica has a rich and diverse fauna and flora, and substantial resources are being devoted to its study. As the biological infrastructure is developed in Costa Rica so it becomes easier to attract more money. However, Costa Rica is small and there remain many larger areas in the neotropics which are comparatively unknown biologically and fast disappearing through lack of local commitment.

*35 Salisbury Avenue, St.Albans, Herts., AL1 4UB. LNHS Odonata Recorder.

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# The London ATALANTA

THE NEWSLETTER OF THE LNHS ECOLOGY & ENTOMOLOGY SECTION - No.20 July 1991

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## THE NATURAL HISTORY OF A SIGNAL BOX

AUSTIN BRACKENBURY*

A lecture at Burlington House, Piccadilly, on 12th November, 1990

Oughtibridge Signal Box was situated a few hundred yards into the southern boundary of Wharncliffe Wood, where the Sheffield to Manchester via Woodhead overhead electric railway line cut through this four miles of woodland. The Box was worked from 1973 to 1983 by a member of the Sorby Natural History Society, Sheffield, who took advantage of this posting to carry out an intensive survey of the immediate surroundings of the Box, an area of approximately 11 yards square, resulting in one of the most detailed and constant surveys of a small area, taking note of the plants, birds, mammals, hoverflies and other invertebrates.

All this ended in 1983 when the Box and railway line closed, but there remains a comprehensive checklist of species, a full photographic record, and a collection of over four thousand invertebrate specimens in Sheffield City Museum.

Wharncliffe Wood, 735 hectares, is the largest tract of woodland in South Yorkshire, extending almost 4 miles northwards towards Wortley from a southern boundary 5½ miles north-west of Sheffield. This Forestry Commission woodland covers the eastern flank of the Don Valley, rising 400 feet from the banks of the River Don to the 700ft plateau. It suffered heavy felling in the 1914-18 and 1939-45 wars and was regularly ravaged by fires up to the early fifties, when the culprit steam locomotives were superceded by electric traction. By this time afforestation had started and the scrub oak, birch, holly and bracken which had covered the landscape was replaced by large blocks of mixed conifers and hardwoods. The continuity of the original woodland invertebrates remained among the tumble of gritstone blocks, steep water-courses and along the margins of the railway line, constructed c.1840.

There is a ten-year account of bird observations ranging from the frequency, or infrequency, of the commoner species such as rook, starling and house

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sparrow to a memorable sighting of a woodcock balancing on the overhead electric wire. Many detailed notes were made following close encounters with small mammals - bank vole, field vole, wood mouse and all three species of shrew; determining food preferences and observing inter-species behaviour. Further notes were made on fox, badger, hedgehog, both squirrels and stoat. A weasel was photographed through a window from a distance of six inches as it fed on fat put out for birds. Railway platelayers assisted in the recovery of bird and mammal corpses from a two mile length of track, the result of collisions with trains. Those in a good state of preservation were deposited with Sheffield City Museum, whilst the rest were submitted to an on-site decay and bone recovery system using perforated plastic containers buried in earth.

A sustained programme of collecting and recording of invertebrates over the ten year period achieved many new County records. Of the approximately 270 species of hoverflies known nationally, 107 were recorded at this constant effort site and information about flower preferences and flight periods established. One of the notable hoverflies recorded was the honey-bee look-alike *Brachypalpus laphriformis*, a strong indicator species of ancient woodland, new to South Yorkshire and only the second from the old county of Yorkshire at the time. *Brachypalpoides lenta*, *Xylota sylvarum* and *X. coeruleiventris*, all good indicator species, were frequent visitors.

Further habitat indicators included *Criorhina floccosa*, *C. asilica* and *C. berberina*, together with its beautiful tawny haired form, v. *oxyacanthae*; and also *Ferdinandea cuprea*, *Sphegina clunipes*, *Melangyna guttata*, *Pipiza luteitarsis* and the smart-looking *Didea fasciata*.

A comparatively recent addition to the British list, *Eriozona syrphoides*, a hoverfly with a probably conifer-specific, aphid-eating larva, was among the most beautiful recorded and was again a first South Yorkshire and second old county of Yorkshire sighting at the time. Another conifer aphid associated hoverfly, *Dasysyrphus friuliensis*, was believed to be only the second for the British Isles when first recorded on 24th May 1977.

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The lecture was illustrated by a fine set of slides, including a family of bank voles feeding from the hand. Further reading of species and events observed 'between trains' at Oughtibridge Signal Box by naturalist ex-signalman Austin Brackenbury and others from 1973 to 1983 can be found in publications of the Sorby N.H.S., listed below:

Brackenbury, R. 1976. Red and Grey Squirrels feeding together. Sorby Record 14: 50.
Brackenbury, R. 1978. The best recorded square in Sheffield. Sorby Record 16: 40-43.
Brackenbury, R. 1981. Weevil watching at Wharncliffe Wood. Sorby Record 19: 46-48.
Brackenbury, R. and Whiteley, D. 1981. Hoverflies of Wharncliffe Wood. Sorby Record 19: 4-17.
Stubbs, A.E. 1982. Hoverflies as primary woodland indicators, with reference to Wharncliffe Wood. Sorby Record 20: 62-67.
Whiteley, D. 1985. Natural History of the Sheffield area and the Peak District. Sorby Natural History Society.

The drawing of a fox on p.77 is by Jeremy Lee of the Sorby Natural History Society, Sheffield.

## A visit to
## THE JODRELL LABORATORY
### The Royal Botanic Gardens, Kew

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If tree roots are invading the foundations of your house, withdrawing moisture and posing the threat of subsidence, you will be relieved to know that research by scientists at Kew has taken the guesswork out of identifying them. If you are a collector, restorer or dealer in antiques, expert identification and ageing of a sliver of wood might be invaluable in your assessment of an enigmatic piece. From enquirers world-wide such requests for help and information are received daily by the staff at the Jodrell Laboratory, Kew Gardens. Forensic departments, biochemists, archaeologists and many others now regularly consult the fund of specialised knowledge enshrined in this unique establishment.

On the evening of 18th April members of the LNHS and of the Quekett Microscopical Club were privileged to visit the Plant Anatomy Section after hours, and gain at first hand some insight into the work there being undertaken. The essence of this is the study of the cellular structure of leaves, woods and charcoals, together with a search for chemicals with biological activity in roots and bark. A cabinet from floor to shoulder height occupied most of one wall and contained slide preparations of woods and plant tissues, all fully indexed, to form a reference collection unsurpassed. It was not long before the roving eye caught sight of a number of books, pamphlets and separates, the published output of the laboratory. Apparatus in use on the benches included a variety of optical microscopes of advanced and specialised design. Conventional transmitted light microscopes, some with cameras fitted to trinocular heads, were to hand for the inspection of various plant tissues. An epi-illuminating microscope was in use for the identification of charcoals. Members were invited to test their skill using a drawing tube. This modern version of the camera lucida enables the operator, whilst looking down the microscope, to see not only the image of the object but also the point of a hand-held pencil poised above a sheet of drawing paper on the bench. With a little practice it was found possible to produce a good outline on the paper of the object imaged in the microscope and traced by the pencil point.

Further developments in the art and science of microscopical examination were on display in other rooms. The structure of transparent or non-absorbent objects is made more visible if the contrast of the image can be optically strengthened, and one method of achieving this uses polarised light split and later recombined by prisms. The minute pits in the side wall of a stem vessel could be seen very clearly with the aid of this form of illumination, known as Nomarski or differential interference contrast. A stand set up for fluorescence microscopy was on view, and the cold light from a fibre optic lighting unit on another instrument was highly effective in showing detail in the underside cuticle of a leaf.

Turning now to the application of electronics, we admired the startling picture being produced by a large scanning electron microscope. An image analyzer, essentially a computer system, could be coupled either to the S.E.M. or to a light microscope, and its ability to establish the dimensions of parts of an image, as for example the diameters of vessels in a transverse section of a stem, was demonstrated; as was a computerised technique affording rapid identification to genera and species of a range of wood samples. It had been an absorbingly interesting visit, and if we had any regret it was that time had all too swiftly passed. But not before we had been assured that not all the work on applied plant anatomy is done behind closed doors. The great storm of October 1987, which had levered mature trees from the ground over much of south-east England, had been seen by the scientists at Kew and Wakehurst as an opportunity to examine, measure, photograph and record the exposed root plates of many species, and obtain root and trunk material for further study. The results have now been published and, to quote from the introduction, "can be consulted for a range of different applications by readers with a diversity of interests".

We are most grateful to our member Dr Peter Gasson for hosting the visit, and to Dr David Cutler, head of the Plant Anatomy Section, for his kind permission.
CBA

Further reading

Cutler, D.F., Rudall, P.J., Gasson, P.E., Gale, R.M.O. 1987. Root Identification Manual of Trees and Shrubs. Chapman & Hall.

Gasson, P.E. and Cutler, D.F. 1990. Tree Root Plate Morphology. Arboricultural Journal Vol.14 No.3: 193-264. Booklet: ISBN 0-907360 181

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SALMON NEWS: Newsletter No.3 of the Thames Salmon Trust reports that 154 adult salmon were recorded in the Thames during 1990. Of these, 63 were monitored at the fish pass and trap at Molesey Weir, almost equally divided between fish which had experienced one and two winters at sea. Ova were obtained from adult Thames-homing females and more than 100,000 fry are now being reared for eventual release.

This year's adult salmon run began with the first fish being recorded at the Molesey trap on May 17th. The best runs occur when there is a good flow of water in the river and the reduced flows of 1990 and 1989 resulted in fewer salmon than in the record year of 1988, when 323 were recorded. The wet summer this year has produced more water in the river, but substantial amounts are withdrawn to replenish the reservoirs and the success of E. & E. Section's planned visit to the Molesey trap on August 10th is likely to depend on whether a good flow continues.

Mr David Willis has been appointed Fisheries Scientist in succession to Mr Peter Gough, whose lecture to the Society last year described the scheme, begun in 1979, to re-establish a breeding population of the Atlantic Salmon in the river after more than a century of absence.

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Wheeler, A. 1980. The Weybridge Salmon. Lond. Nat. 59: 49-51.

Solomon, D.J. 1975. The decline and reappearance of migratory fish in the tidal Thames, with particular reference to the Salmon. Lond. Nat. 54: 35-37.

Andrews, M.J. 1980. Review of 'The Tidal Thames: the History of a River and its Fishes', by Alwyne Wheeler. Routledge & Kegan Paul, London, 1979. Lond. Nat. 59: 96.

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# The London ATALANTA

THE NEWSLETTER OF THE LNHS ECOLOGY & ENTOMOLOGY SECTION - No.21 February 1992

## PARTNERS FOR LIFE

### Some ant/plant relationships

DR MARTIN INGROUILLE*

A lecture at Burlington House, Piccadilly, on 12th November, 1991

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Different organisms living together, each taking advantage of the presence of the other, form the normal pattern in the living world. In many cases the relationship has become a close one, a specificity between partners, so that they have become adapted to each other. Most often the partnership is unequal, one organism using the other to its detriment as food or home. It is adapted to do so and in turn the victim is adapted to minimise being used. There are numerous examples of the co-evolution of host and pathogen, of host and parasite, of predator and prey, of herbivore and plant.

Mutualism or symbiosis, where each partner gains from the relationship, is rarer or perhaps just less visible. For example, there are the mycorrhizal relationships between plants and fungi which are so fundamental to plant nutrition. Symbiosis is marked, too, by a range of adaptations of one species to the other. The currency of the relationship between plants and ants, especially significant in tropical and sub-tropical habitats, falls into several categories; the provision of a home, of nutrition and of defence being the most important. Ants are very good partners for plants because few of them have evolved methods or behaviours for eating leaves. At least 103 genera in 36 families of plants have ant-plants, myrmecophytes. Many of them are epiphytes.

1. Provision of a home. One important category of epiphytes is the trash basket plants, including ferns and aroids, which collect detritus into which their roots grow. The basket is often occupied by an ant nest. One common species of ant, *Camponotus femoratus* , is rarely found in the absence of a host epiphyte. The ants forage widely, bringing decaying leaves, bark, faeces and other material to the trash basket. They are provided with a home and in return aid the nutrition or defence of the epiphyte. Some ants build their nests directly on the bark and these provide sites for the seeds of epiphytes to germinate. Then, as the ephiphyte grows, its roots help to strengthen the growing nest.

Certain myrmecophytes have a range of more complex adaptations. They have chambered organs, "domatia", which the ants occupy. In the epiphyte *Myrmecodia* there are two kinds of chambers in the basal tuber. Some are smooth walled and dry brood chambers. Other chambers are warty and wet walled. These are ant latrines and rubbish tips where nutrients are absorbed by the plants.

In *Acacia* some species have swollen thorns which provide a home. This adaptation has evolved separately in African and American acacias. The ants protect the acacia from herbivores. Acacias with swollen thorns have dispensed with the chemical defences against herbivory common in other species.

2. Provision of nutrition. As noted above, the presence of ants often improves the nutritional conditions of epiphytes. It is not rare for the plant to provide the ant with nutrition either in return or for other services. Many plants have extra-floral nectaries which provide sugars. Various oily or starchy appendages are produced by glands on petioles and elsewhere. The relationship may shift into a parasitic or herbivorous one where ants tend phloem feeding Homoptera, or leaf-cutter ants harvest leaf material to maintain their fungal gardens.

3. Provision of protection. In return for a home or for nutrition, some ants protect their host. Ants will protect their own nest and in so doing protect the epiphyte associated with it, even against the attacks of leaf-cutter ants. They will attack at some distance from home and ceaselessly patrol the host. The ant *Azteca* is very aggressive and will congregate on the side of the plant threatened by a large herbivore. Some ants are not very aggressive but nevertheless protect the host by gleaning insect eggs and larvae and perhaps even fungal spores from the surface of the plant. They are cleaners and sweepers. Others are gardeners pruning back competing creepers which would otherwise smother the host. Orchids are the commonest ant-protected epiphytes. They form transient relationships with ants while they are flowering. The ants are encouraged to stay and protect floral buds and flowers by the presence of extrafloral nectaries on the pedicels and bracts. A few orchids also provide a home for ants in hollow pseudo-bulbs.

4. Dispersal. Myrmechory, the dispersal of seed by ants, is very common in some habitats. In Australia there are 1500 species of plants dispersed by ants. Usually the relationship is not a very close one since the ants will collect a range of seeds. The relationship is encouraged by the presence of an oily or starchy aril or elaiosome on the seed. Some plant species seem to have seeds the size, shape and even colour of ant larvae. In some senses epiphytic myrmecophytes allow the easier dispersal of ants since they provide a place for ant nests.

5. Pollination. This common relationship between insects and plants is very rare with ants. Ants have hard smooth exoskeletons little adapted to picking up pollen and there is evidence that the antibiotic secretions of ants damage the pollen. We little understand many aspects of tropical ecology, but it is already apparent that mutualisms are very important in the complex web of relationships present. Perhaps 20% of plant species grow epiphytically. They grow in an extremely nutrient-poor environment. The relationship of ants with epiphytes may be critical in the establishment and survival of many such plants.

However, ant/plant relationships are not confined to the tropics. Several of our native species of plants, including bracken, have extra floral nectaries or are closely associated with ant nests.

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# THE RIVER BOURNE SURVEY

S. J. Brooks

On 14th September 1991 a small group of us visited the River Bourne near Addlestone to follow up a survey of the invertebrates that we had carried out the previous year. The river had been subjected to a serious pollution incident early in 1990 that had destroyed all plant and animal life. By the time of our first survey, in September 1990, there had been some recovery. Only a few species were present, but in general they were represented by large numbers of individuals. In particular, the mayfly *Baetis vernus* was extremely common.

This improvement in the water quality appears to have continued into 1991 and by the time of our second visit several more species and orders were present in our samples. Only one species of fish, the minnow, was found in 1990 but in 1991 we quickly found minnow, pike, bullhead and stone loach. One of the last was host to the fish leach *Piscicola* sp.

Another interesting find was the hairworm *Gordius* sp. which is an insect parasite in its larval stages. *Baetis vernus* was still present in large numbers, together with water shrimps *Crangonyx* sp. and water lice *Asellus*, the beetle *Haliplus* sp. and the mollusc *Hydrobia jenkinsi*. We also sampled a small tributary to the river and found a much richer fauna. Species absent from the main river but present in the feeder stream included the molluscs *Limnea pereger* and *Planorbis* sp., the mayfly *Cloeon* sp., and several species of Diptera and Coleoptera. This suggested that the river may still have been suffering from the effects of pollution.

This impression was reinforced when we visited another site on the river at Emmets Mill which is upstream of the pollution infall. Here we found several groups of invertebrates apparently absent from the sampling site further downstream including flatworms *Polycelis nigra*, blackflies *Simulium*, damselflies *Calopteryx splendens* and caddisflies *Hydropsyche* sp. Large numbers of baetid mayflies were again evident. Most were *B. vernus* but *B.fuscatus* was also present. While we examined one of the trays containing a netfull of darting insects from the river, I noticed that one of the *Baetis* larvae had dark, swollen wing buds which is characteristic of a fully metamorphosed larva. Within a few minutes we were able to witness the emergence of the sub-imago. The speed that this was achieved was breathtaking for within seconds of the larva swimming to the surface of the water the thorax split and the dun emerged and took flight. This is in interesting contrast to a damselfly which may take over an hour to complete its emergence.

Judging from the relative paucity of invertebrates at Addlestone compared to a small tributary and from a site further upstream, it seems that the river has not fully recovered from the pollution incident of 1990. However, the distribution of aquatic invertebrates is also affected by many other factors including the nature of the substrate, amount of aquatic and bankside vegetation and speed of the current, which we have not been able to take fully into account. A full list of species recorded is available.

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Previous references to the pollution in the River Bourne are in LNHS Newsletters Nos. 100, 103 and 104.

OXLEAS WOOD: a letter from J.Edward Milner to Sir Hugh Rossi M.P., The House of Commons, London, S.W.1. 21st January, 1992.

Dear Sir Hugh,

I was most disturbed by the recent report that the Government has taken compulsory purchase powers over part of Oxleas Wood, apparently to pre-empt the EC Commissioner's questions about the whole scheme of destroying ancient woodland so as to build the ELRC Trunk Road.

I have been concerned about Oxleas Wood for some time and indeed have been a registered protester during the latter stages in the public consultation process. Having read both the papers of the Public Enquiry, and the subsequent deliberations of the Secretaries of State for Transport and Environment, and having conducted some ecological studies in the wood myself (published in The London Naturalist) I fear that if the ecological case for preserving Oxleas Wood has ever been comprehended by the Department of Transport decision-makers they have never taken it seriously. It is always mentioned as nothing more than an adjunct to the value of the woodlands as a public open space, a completely different point. The conservation importance of the wood in the context of London and the South-East generally was never considered, and the conclusion that the planned damage though serious "is environmentally acceptable" (their words) is one that few people outside the Government seem to support.

Secondly, there is the question of the precise route of the planned road. Any local naturalist and most local residents could have told the Department that the proposed route in the Oxleas area was just about the most damaging possible, yet no serious attempt has been made to find a less damaging route in the same area that would destroy little or none of the ancient woodland. This could easily be done, though some additional cost to the whole scheme would be incurred, but certainly less than the 11.9% that was apparently "reasonable" for the loss to the SSSI. The conclusion that the damage though "regrettable...does not justify rejection of the Department's proposals" clearly implies that the attitude to objectors was an all-or-nothing one.

I must say that I can only hope that Mr Ripa de Meana is successful in causing the environmental impact of the present plans to be properly assessed in a much more serious way than seems to have been done up to now.

In the end this scheme is really disastrous; no-one with any concern for the environment would have started on the scheme in the present form. I do hope that a complete re-think can be had without all the preconceived and environmentally philistine ideas of the Department of Transport having such sway, when we are trying to comment on other countries' performance at the forthcoming Earth Summit. If we can't behave better what right have we got to tell the Brazilians or anybody else how to conserve their environment?

Yours sincerely,
J.Edward Milner,
LONDON, N.8

Members wishing to comment should write to Sir Hugh Rossi at The House of Commons - Ed.

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SALMON NEWS: From Newsletter No.4 of the Thames Salmon Trust we learn that during 1991 nearly 80,000 parr were released into the Kennet and other tributaries, and more than 77,000 smolts at five sites on the Thames between Sunbury and Woolwich. Sixteen fish passes are now in operation and 23 more are planned or in construction. It is thought that poor smolt survival at sea in 1989 and 1990 was a major factor in the disappointing return of adult salmon to the Thames and other British rivers in 1991.

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# The London ATALANTA

THE NEWSLETTER OF THE LNHS ECOLOGY & ENTOMOLOGY SECTION - No.22 JUNE 1992

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## ICELAND REVISITED

### JOHN THOMPSON*

A lecture at Burlington House, Piccadilly, on 17th March, 1992

An earlier lecture by a Society member demonstrated that Iceland is not the exclusive preserve of the hardy explorer. I hope that my experiences may similarly inspire others to visit this remarkable country. The name itself creates a somewhat misleading picture, though icecaps - Vatnajokull is the largest icecap in Europe - do occupy one eighth of the total area. The bleak, gravelly desert of the interior is a relic of the last Ice Age and it is therefore not surprising that almost everyone lives in coastal areas. There are only some 260,000 Icelanders, more than half of whom are resident in and around the modern capital city of Reykjavik.

In July, 1991 my wife and I began our third visit to Iceland by travelling from Reykjavik to Isafjordur in the north-west by bus and ferry; a journey of contrasts of pace and landscape, along rough tracks, around treeless fjords. At the time of settlement in the ninth century Iceland was well wooded, but exploitation has left only a few stunted birch woods. Forestry is now being introduced with some success. Isafjordur is a fishing town where the main catch is shrimps. These are processed locally and appear on our supermarket shelves as 'North Atlantic Prawns'. A daily bus enabled us to explore neighbouring valleys where we found typical Icelandic flora, mainly north European and alpine but with a few species of North American distribution, such as northern green orchid and arctic river beauty, a particularly flamboyant willowherb. Other species found included alpine bistort, alpine fleabane, mountain avens, alpine gentian, starry saxifrage, marsh cinquefoil, Hornemann's willowherb, frog orchid and heath spotted orchid.

It is possible to visit Hornstrandir, the most north-westerly point of Iceland, by a ferry with a somewhat erratic timetable. A more reliable excursion is by speedboat to the island of Vigur with its arctic tern colony and black guillemots strutting pigeon-like on the shore. The island family subsist on small scale dairy farming, collecting eider-down and catching puffins for sale to restaurants on the mainland. Sea birds have traditionally provided a vital source of food (and sometimes fuel) in isolated areas until communications improved in very recent times.

From Isafjordur it is a short flight to Akureyri, commercial and cultural centre of northern Iceland, with its fine museums and excellent botanical garden. Reykjahlid, the main settlement beside Myvatn, may be reached by bus. A dramatic skyline surrounds the lake, which is one of Europe's most important wildfowl sites. Fifteen species of duck breed here including two species to be found nesting nowhere else in Europe: the harlequin and Barrow's goldeneye. There is an interesting flora and species seen included slender gentian, alpine catchfly, slender bedstraw, rock speedwell, water avens, arctic sandwort and Iceland poppy. Myvatn is on the edge of the volcanic zone resulting from the tectonic activity of the Mid Atlantic Ridge. Almost every manifestation of volcanism can be found in the area. Remnants of sub-glacial volcanoes, crater rows, ash rings, pseudo craters, explosion craters, fissures and hot springs are all within reach; on foot, by tour bus or hired cycle. To walk over the lava and through the craters of the eruptions of 1975-84 is an unforgettable experience. Activity here could resume at any time.

Local industries include a geothermal power station precariously sited within the Krafla caldera, and a plant for the processing of diatomaceous mud from the lake into a filtering medium and abrasive. The resultant deepening of the lake is to the disadvantage of dabbling ducks and the continuation of this industry is a matter of some controversy. A coach tour from the lake explores the north coast and the course of the Jokulsa a Fjollum, where fissure eruptions across the line of the river have left fantastic basalt features at Hljodaklettar - the 'echo rocks'. Upstream, the most powerful waterfall in Europe, Dettifoss, presents an awesome spectacle. There is no doubt that the right kind of tourism is of assistance to those fighting for sensitivity in hydro-electric developments, and may help ensure the future of Dettifoss and Iceland's natural heritage. A package tour can offer value for money and cover much ground in a short time, but a leisurely, independent visit will give a greater insight into Iceland and its natural history. Car hire is expensive but there is a useful though not necessarily frequent bus network, and an excellent and affordable domestic air system. The summer weather is not daunting, though generally cool, in Europe's last great wilderness.

Further reading:

Iceland, the Traveller's Guide. Tony Escritt. 1990.
Guide to the Flowering Plants and Ferns of Iceland. Hordur Kristinsson. 1987.
Iceland, Nature's Meeting Place. Mark Carwardine. 1986.
Myvatn, a Paradise for Nature Lovers. David Williams. 1988.
Iceland, Greenland and the Faeroe Islands. Deanna Swaney. Lonely Planet Guide.

Maps and the first four titles may be had from the Iceland Travel Club, P.O.Box 434, Harrow, HA1 3HY; 081-422 2825. The Iceland Brochure Unit is at 5 Maple Close, Tunbridge Wells, Kent, TN2 5LB; 0892-546155. *John Thompson is a member of E. & E. Section Committee.

## FIELD MEETINGS

### Horsenden Hill. 31 July 1991. Richard Goulding.

Perivale Wood and Horsenden Hill provide a green oasis in an otherwise heavily developed area to the west of London. Bounded by Sudbury and Wembley to the north, and by Perivale to the south, the hill rises steeply to a modest elevation of 75 metres and is essentially an Eocene formation of the London Clay, overlain by the sands and clays of the Bagshot and Claygate Beds, and capped by relict Ice Age gravels. The meadows which lie below the heathland and scrub of the upper levels descend to the Grand Union Canal and are bisected by the 50 metres contour.

One of the objectives of this evening field meeting was to locate and identify bats with the aid of an electronic bat detector. Disappointingly enough, the hoped-for noctule bats failed to put in an appearance, but the three hours between 7 p.m. and dusk were put to good purpose by a tour of the several distinct habitats to be found in the area. A short walk north from Perivale Station brought us to the densely wooded Nature Reserve. The presence of several wild service trees *Sorbus torminalis* among the predominating oaks and hornbeams was a clear indication that this is ancient woodland, 400 years old at least, perhaps much older. After crossing the canal by the road bridge we ascended the hill to a stretch of treeless heathland. Outstanding among the trefoils, vetches, clovers and knapweeds typical of such a habitat was a single example, in bloom, of the smooth restharrow *Ononis repens* , decidedly uncommon off the chalk, and perhaps influenced by the presence of a dumped calcareous substance of unknown origin. The predatory soldier beetle *Cantharis* was plentiful in pairs on *Cirsium arvense*.

Urban west London is not noted for its hedgerows, but here hedgerows of hawthorn, goat willow, ash and sloe still persist and afford shelter to lady's bedstraw, golden melilot, scentless mayweed, garlic mustard and many others. The bryophyte *Hypnum cupressiforme* was covering a log beside the path on the way to the meadows, where black medick, tufted vetch and meadow buttercup abounded. On this fine summer evening meadow brown butterflies continued on the wing almost until dusk. As the light faded a little owl was heard calling and some ten pipistrelles were seen and their distinctive calls recognised on the detector.

A full list of the 75 species of plants noted on the walk is on file and may be had on application to the editorial address on page 88. The flora and birdlife of Perivale Wood Nature Reserve were investigated by K.A.Roberts and P.J.Edwards between 1965 and 1973 and their findings were published in The London Naturalist 53: 34-70.

Epping Forest. 14 October 1991. Leader: Tricia Moxey.

It was a fine, mild autumn day when LNHS members joined forces with the Witham NHS at the Conservation Centre, High Beach. Over coffee we were given a short but valuable introduction to the Forest and continued with a tour of part of the adjacent ancient woodlands. Venerable beeches and hornbeams formed a leafy canopy high above, the results of pollarding a century ago. Fine examples of bracket fungi were seen, notably the beech heartrot fungus *Ganoderma adspersum* which destroys the central part of the trunk, and the beefsteak fungus *Fistulina hepatica* which grows on oak trees, staining the wood a chestnut brown and forming edible reddish brown brackets on the sides of branches. Attention was drawn to the 60 years old silver birches which had grown up on former open land as a result of the reduction in grazing pressure from fallow deer. These trees had almost reached the end of their normal life span, with the deeply fissured bark providing habitats for numerous insects and spiders. The bases of several were covered with a fine growth of mosses and lichens, mainly *Cladonia* spp. The brackets of the parasitic fungus *Piptoporus betulinus* were noted on some. Recent rain had encouraged the growth of some of the smaller fungi, several species of fairy bonnets *Mycena* spp. being found alongside some excellent specimens of the red and white-spotted fly agaric *Amanita muscaria*; and also tufts of the tawny coloured toadstools of *Armillaria mellea*, the honey fungus.

We then turned our attention to approximately an acre of woodland at Rushey Plain, where some repollarding of hornbeam and beech had been carried out seven years ago. The ground flora had returned to some extent but overall it was the invasive bracken which dominated the scene. The hornbeams had shown some regrowth of numerous thin, whippy shoots about two metres long. The repollarding of the old beech trunks had not been a success as there was no regrowth and the trees appeared to be dead.

Our afternoon session was in Bury Wood, on the western side of the forest between Chingford and the village of Sewardstonebury. On a three acre site some hornbeam and oak trunks had been repollarded during the autumn and winter of 1990-91, each tree being numbered so that a record could be kept of its subsequent development. The regrowth from the hornbeams was reasonable, but the leaves of some of the oaks were covered with the white mildew *Microsphaera alphitoides* and the twigs were stunted. Ground level ozone was reported to damage leaves, making them more likely to harbour aphids, in turn providing an increased food source for birds and coccinellids. A poor growth response by some species of trees when repollarded might be due to the damage caused by modern cutting machinery or the extensive nature of the surgery. Possibly the shock of losing the whole of the crown of branches and removing all potential for food production might prove just too much for some aged trees.

Log piles of larger branches had been left, but smaller branches had been converted into wood chippings and liberally spread over the site. No dramatic changes in the ground flora were obvious, mainly because the wood chippings appear to have deterred the establishment of most plants with the exception of bramble. It was thought that the opening up of the overhead canopy had encouraged the breeding of the holly blue and speckled wood butterflies. Dry leaf litter was examined and further fungi noted: sulphur tuft *Hypholoma fasciculare* , common ink cap *Coprinus atramentarius* and candle snuff *Xylaria hypoxylon* . *Volvariella speciosa* was found growing on the wood chippings.

All concerned had enjoyed an excellent day and thanked Mrs Moxey and the Conservation Centre for their facilities, guidance and information; and for much appreciated transport from and to Loughton station.

George Loveland.

### Keston Common and Down House. 9 May 1992. Keith Hyatt.

Heavy rain had set in by the time members had assembled at The Fox on Keston Common. Clearly it wasn't going to be a leisurely spring stroll, but nevertheless we agreed to do a circuit of the area. We picked our way through dripping woods of Scots pine, oak and birch to the two lakes north of Fishponds Road, where the hard, pebble terrain, together with the name - Forest Ridge - of a nearby lane, were reminders that Hayes and Keston Commons are on a ridge of the pebbly Blackheath Beds. A pair of tufted ducks and two pairs of Canada geese, one with young, were on the water. The attractive alien *Aponogeton distachyus* , which has been established in the upper lake since 1931, was in flower and looked especially fine, due partly to the fact that it was too early for the water-lilies to steal the show. We inspected Keston Bog and noted that a series of low bunds had been constructed down the slope which will have the effect of retaining more water during dry conditions without flooding at other times. It was still raining hard and we made back to The Fox.

After lunch we drove to the Darwin Museum at Downe, near Biggin Hill, there to be welcomed by the Curator, Mrs Solene Morris, who kindly provided an informed and revealing insight into the life and work of Charles Darwin. We were free to wander through the rooms where memorabilia and portraits of Darwin, his family and contemporaries are on display. Down House and garden is open during the summer every afternoon except Mondays and Tuesdays. Further information may be obtained on 0689 859119.

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# The London ATALANTA

[illegible] AUG 1992

THE NEWSLETTER OF THE LNHS ECOLOGY & ENTOMOLOGY SECTION - No.23 AUGUST 1992

## SOME OBSERVED CHANGES IN THE LEPIDOPTERA OF HAMPSTEAD HEATH

RAY SOFTLY*

The Parmenter Lecture
Burlington House, Piccadilly, 6th May 1992

Hampstead Heath is known as one of the first places to have received close botanical study and to have enjoyed periodic if not continuous attention ever since. Probably there are few small areas that have had the benefit of periodic entomological observation over a century. There are places such as Gilbert White's Selborne that have been closely observed over a wide spectrum of natural history during the course of a lifetime, and this Society initiated in 1942 the Bookham Common Survey which has created 50 years of continuing scientific data over a wide field. I wish to deal with lepidoptera recording on the North London Heights, covering the Hampstead and Highgate area, from which observations have been recorded from the last two decades of the 19th century more or less continuously to the present; resulting in published lists at the beginning of the century, secondly in 1913, thirdly in 1967, and in my own as yet unpublished records (though all incorporated in the data held by the Society) from 1975 to the present day.

Hampstead Heath rises to some 440 feet above sea level, a few feet higher than the cross on the dome of St. Paul's which, given the necessary clarity of air, is plainly visible from several points. The upland area from Hampstead to Highgate is a comparatively isolated ridge between the lower lengths of the valleys of the Lea and the Colne, giving rise to its own minor tributaries of the Thames, for example the Fleet and the Westbourne, both long since culverted and commemorated as street names; but their headwaters may be traced as a series of still visible springs on the Heath's open hillsides. A more northerly flow swings further to the west to feed the Brent, which divides the North London Heights from their lesser outlier, Harrow-on-the-Hill.

It is not my intention here to deal with the fascinating geological history of the area. Suffice it to say that at Hampstead the London Clay is capped first by the Claygate Beds, a variable mixture of clay, sand and gravel, unevenly permeable and in places giving rise to its own spring line, and that this layer is topped by Bagshot Sand from the edges of which the water oozes out in a number of springs. You will recognise the place names that have been bestowed on these geological strata as coming from south of the Thames and this outcropping north of the Thames is, within the Society's area, almost unique and considerably isolated.

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This gives rise to a climatic island reflecting temperatures outside London away from the built-up area, combined with a greater rainfall.

The habitats thus formed were described by Tansley in 1913 in terms of plant communities. He listed them as: on the Bagshot Sands - sandy oakwood, hawthorn and birch scrub, grass heath, ling heath; and on the wetter areas - bog, marsh, reed swamp, aquatic. Considerable change in all these has taken place since 1913, mainly by natural succession, but also by surrounding building making for isolation from other countryside and disturbance by public use. This is the area in which lepidoptera recording has taken place for a century.

Who did the recording? The City of London Entomological and Natural History Society drew its membership mainly from north of the Thames and it was in that society that the idea arose of listing the lepidoptera of Middlesex. This Watsonian vice-county is now built up from the Lea to the Colne, and the main areas that might still be described as anything like open country are: to the north, Enfield Chase; to the west, parts of the valley of the Colne; to the south, the complex of reservoirs and gravel pits, and Heathrow Airport. But at the end of the last century the City of London was still bordered north and west by distinct townships lying in mainly pastoral land, the source of hay and horses for London's transport, together with market gardens. Many private woods and estates remained.

The society had no more than forty or so members, mostly living in what are now inner city areas. None lived in Hampstead or Highgate, but they collected lepidoptera around these villages and on Hampstead Heath and in Highgate Woods, and the society's minutes record exhibits from such areas. When Buckell and Prout drew a line at the year 1898 and published their list they divided the county into quarters, the North London Heights being included within the north-west area. Fortunately, they gave place names to their records. At the turn of the century the society acquired a Hampstead member, a Mr. Hopson, and he provides a link with the next list based on the Hampstead area.

This was published in 1913 by the Hampstead Scientific Society, of which he was also a member. The H.S.S. survey included not only Hampstead Heath but extended to a circle of three miles radius from the Whitestone Pond, thus including Regent's Park, the Brent Reservoir, Highgate Woods, Bishop's Wood (which had only begun to be developed as Bishop's Avenue), and other woods and farmland then existing out to the Mutton Brook. But the record is very short on names of localities and it seems that for the lepidoptera the concentration was on Hampstead and its Heath. There was then a gap until C.I.Carter came to Hampstead in 1950 and lived and recorded there for eight years.

Our own member, the late Baron de Worms, had meanwhile done the research necessary for a survey of the butterflies and moths of our Society's recording area, based upon a circle of twenty miles radius centred on St. Paul's. This brought the records up to 1954, with reviews continuing to 1978, after which Colin Plant took over. From the sparseness of the Hampstead records it appears that there had been little recording in the North London Heights in the interval until I came to Hampstead in 1975 and began light trapping on a continuous basis in the autumn of 1979.

For the following statistics I have included only the macro-moths and of these I have ignored the migrants, so that I am dealing only with resident species whose breeding area or flight range includes the North

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| London Heights: | recorded 1880 - 1898 | 322 | |
| | species presumed lost | 97 | (66 not seen subsequently<br>(31 not seen after 1950 |
| | species still present | 225 | |
| | species new this century | 49 | |
| | present total | 274 | |

So for every two species lost, one new one has arrived. Of the 322 last century records the H.S.S. could find only 149. Of these, Carter in the 1950s found only 50, but he did find 35 others, all previously known in 1898, totalling 85. He compared this total with that of the contemporary Buckingham Palace Grounds records, totalling 153, and in 1967 wrote an article about it in the journal of the South London Entomological and Natural History Society. Taking the records at their face value, he concluded there had been not only a considerable loss but also a notable species change. Looking to my own records, am I to conclude there has been a subsequent considerable recolonisation? No, I think the problem here lies in the interpretation of the records. We have to recognise our ignorance of the methods and intensity of observation of the different recorders. I believe that for the most part both the H.S.S. and Carter were unaware of species which were there but which their methods failed to reveal and which my own lengthy and continuous trapping has demonstrated are still present.

Is it possible to draw from these statistics any general conclusions about species change over the years? I think we must acknowledge the hit and miss methods used for recording moths and how greatly results can differ even in trapping sites that are not far removed from each other, let alone where the habitats differ. Dusk netting, beating for larvae, sugaring, trapping; every method produces its different results. Likewise, populations often vary enormously from year to year. It may be a question of being in the right place at the right time to be aware of a species' existence in a neighbourhood. But, bearing all this in mind, we can still attempt to draw some general conclusions from the records.

We eagerly await the publication of distribution maps for the moths of the London Area which are in course of preparation by Colin Plant, and these will throw light on the significance of the presence or of the presumed absence of a species in relation to the North London Heights. Plant has already analysed his records in a number of significant groups and I am grateful for some advance information.

Of the 511 species that he regards as resident in the London Area, he concludes that 188 occur virtually throughout. This 188 should constitute a base line for the study and comparison of any one locality. If therefore we assume that all the 188 are likely to be included in my current list for the North London Heights, that leaves an additional 86 species that fall into other categories, which Plant lists as:

(a) widespread but localised
(b) very local - known from less than 31 tetrads
(c) extremely local - known from less than 11 tetrads.

If the North London Heights have their proportionate share of each of these groups we might expect to find there:

35 species that have a special stronghold in the area
21 species representing quite isolated populations
30 species found in only a handful of other localities in London.

There is of course no reason why the North London Heights should have these particular proportions, and probably there is in fact a greater proportion of the first category, based on such localised habitats as the Heath's woodland, grassland and wetland. The majority of species really local in London are very probably confined to habitats based on chalk and older geological formations in Surrey and Kent. But it will be interesting (and of great value for conservation policy) to see how important the North London Heights are for particular species.

Taking a few examples of apparent extinction, it is notable that the whole of the Lasiocampidae - the eggars and lackeys - seem to have disappeared; seven species all told that were known in the nineteenth century and not recorded since 1913. Of these, the small eggar is well documented as having shrunk in numbers and range in Britain. But the lackey, the December moth and the drinker all show post-1960 records in most of the 10 km squares adjacent to the one containing Hampstead Heath, and there seems to be suitable foodplant and habitat for each species; yet I have not seen hair or hide of any of them since I came here in 1975. Other apparent losses are such reasonably detectable species as the large emerald, the magpie and the early moth, again species that would be expected to occur still.

Of the species recorded here by me for the first time, some are well known as recent colonisers of Britain or as having expanded their range. It must be admitted that 12 of the 49 of them are on the basis of a single specimen seen in the course of fifteen years and subject to dismissal as fortuitous vagrants.

To pick out a few of the rest: the six-spot burnet has been seen twice as the odd singleton, but the narrow-bordered five-spot is established as a tight but flourishing colony. The toadflax and the foxglove pugs both come regularly to light. The latticed heath, an obvious enough day flier, has been seen singly in four different years and does presumably maintain a sparse but continuing population on the wetter meadowlands. The brown-tail is regarded as a pest in the lower Thames Estuary and is recorded here most years at light. The varied coronet is a recently established newcomer to Britain and has been recorded at light a few times. The suspected, seen as an occasional presumed straggler at the trap operated nightly where I live, seems to have its base in the woodlands at Kenwood, having been trapped in some numbers in that area in the few years when a light was regularly operated there. The black rustic has recently spread east and north across London; after single appearances in the early 1980s it has turned up again with four in 1990 and three in 1991. The pale-lemon sallow, recorded up to 1980 from only twenty-six 10 km squares scattered through south east England, has shown up on a few occasions at light and in numbers as larvae obtained from fallen poplar catkins. These examples show the very varied status of the newly recorded species.

To be continued

Species mentioned in the text: Eriogaster lanestris, Malacosoma neustria, Poecilocampa populi, Philudoria potatoria, Geometra papilionaria, Abraxas grossulariata, Theria primaria, Zygaena filipendulae, Z. lonicerae, Eupithecia linariata, E. pulchellata, Semiothisa clathrata, Euproctis chrysorrhoea, Hadena compta, Parastichtis suspecta, Aporophyla nigra, Xanthia ocellaris.

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# The London ATALANTA

- 5 OCT 1992

THE NEWSLETTER OF THE LNHS ECOLOGY & ENTOMOLOGY SECTION - No.24 OCTOBER 1992

## SCENES FROM SCANDINAVIA

BRAD ASHBY

A lecture at Burlington House, Piccadilly, on 14th July,1992

Between the rich farmlands of southern Sweden and the remote tundra of Lapland there is a wealth of varied terrain of great interest to the visiting naturalist. Air travellers to Scandinavia are well served and even in the far north those roads that exist are good; but when my wife and I visited Abisko in north Swedish Lapland in 1983 and 1984 we went on the night train from Stockholm. In under 24 hours the train traveller is transported through immense forests of spruce and pine; along the shores of great lakes, remote and unpeopled; across foaming rivers and through virgin country where no road penetrates and only the railway itself betrays the hand of man. If fortunate enough to occupy a compartment near the front, roe, elk, reindeer and raptores by day, and the larger owls in the northern twilight, may be seen quite near the line. Abisko, Lat.68°23', is some four hours, by train, north of the Arctic Circle. There is a hotel, but our choice of accommodation was one of several comfortable stugas within sight of Lake Torneträsk.

The boggy moorland which stretched almost to our door was carpeted in places with the white, nodding blooms of the cloudberry, *Rubus chamaemorus*. Greenshanks came to feed before our windows in the early morning and in the cold, clear air of evening short-eared owls might be seen in spectacular display-flight. Rough-legged buzzards came past in ones and twos and small parties, both by day and in the light of the midnight sun. For this was June, with the birches breaking freshly into leaf, newly emerged emperor moths expanding their wings, and the ice almost gone from the lake. Here several pairs of long-tailed ducks were engaged in courtship, the distinctive bugle-calls of the drakes breaking the silence. A duck pintail flushed from her nest and eggs among rocks and scrub beside the Abiskojokk, the torrent which flows through a slaty canyon towards the delta at its entry to the lake. The races of the yellow wagtail in Europe are many and various; those at Torneträsk are of the northern form *thunbergi*. Several pairs were carrying food. In rock crevices and stony places bordering the river the mountain avens *Dryas octopetala* had opened its flowers to the sun and on the slopes above the lake could be found the insectivorous *Pinguicula alpina* and the arctic rhododendron, *R. lapponicum*, newly in bloom. A few examples of the Lapland fritillary *Euphydryas iduna* were making short, low flights but frequently settling to the ground amidst bilberry and dwarf birch.

The Kungsleden is the longest of several marked trails which radiate from Abisko through wilderness areas otherwise all but inaccessible.

Overnight huts are spaced at intervals and although in places the rocks bear the marks of boots the hours may pass in solitude. Once, a long trek from any base, we met two young women, each with back-pack and staff, who enquired in near-perfect English if we had seen the seldom bird. The Abiskojokk, cold and clear from the melting snows, cascaded noisily through the falls, sparse birch woods on either side. A three-toed woodpecker showed briefly. In a swampy clearing we came suddenly upon a hawk owl perched motionless on the topmost spur of a broken tree, and moments later saw its mate guarding an owlet, well grown and watchful. There was just time to take in details of his distinctive plumage before the male, or so I presumed, launched forth on a straight line to my head, swerving past at the very last moment. A seldom bird indeed.

The Karsavaggen, another famous trail, crosses the river and ascends through the birch forests which in these latitudes form the tree-line on the mountains. Bluethroats, redwings, bramblings and arctic redpolls are one's companions before the trail emerges from the trees and leads across the tundra to a vast amphitheatre ringed by snow-capped mountains. This is the preserve of golden eagles, merlins, willow grouse and white coated mountain hares. A pair of ring ouzels had a nest and five pale blue eggs in a rocky gully, and daylong the calls of distant cuckoos hung upon the air. Mountain butterflies included the fritillary *Clossiana freija*, the dewy ringlet *Erebia pandrose* and the northern form *cyparissus* of *Vacciniina optilete*, the cranberry blue. A party of reindeer descended to the river, which here is wide, fast and shallow, sparkling its way over a stony bed. As they began to file across, five long-tailed skuas appeared overhead and settled on the ground and rocks at no great distance. We returned to this wild spot a few days later to check if nesting had begun; but lemmings were scarce that year and the skuas had moved on.

The bus which runs from Abisko to the iron-ore mining town of Kiruna passes within easy distance of the well known Stordalen. At some seasons this swamp is well nigh impassable and we had some difficulty in making progress. But by ascending a wooded knoll we could see previously hidden pools where a black-throated diver and several Slavonian grebes, here at the northern limit of their range, were resplendent in their summer plumage. The train which routes northward and westward from Abisko ascends to bare, rocky heights and affords the sight of stupendous scenery as it runs the length of the Rombak Fjord on the way to Narvik. By arrangement with the guard the train will halt at Laktatjakka, giving access to two divergent trails through the mountains. A thoughtful administration has provided a giant lollipop sign so that you may halt the train when it returns late in the afternoon. From Vassijaure, another stop on this line, the trail northward through open fellside and lake-dotted tundra may be concealed at this season by snow, but is marked by cairns clearly visible after the early morning mists have lifted.

In 1987 we motored up from Gothenburg, and in 1988 from Oslo, to another notable wilderness area in northern Sweden: the province of Jämtland.

- To be continued -

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- 5 OCT 1992

# Some observed changes in The Lepidoptera of Hampstead Heath

## Part 2

RAY SOFTLY

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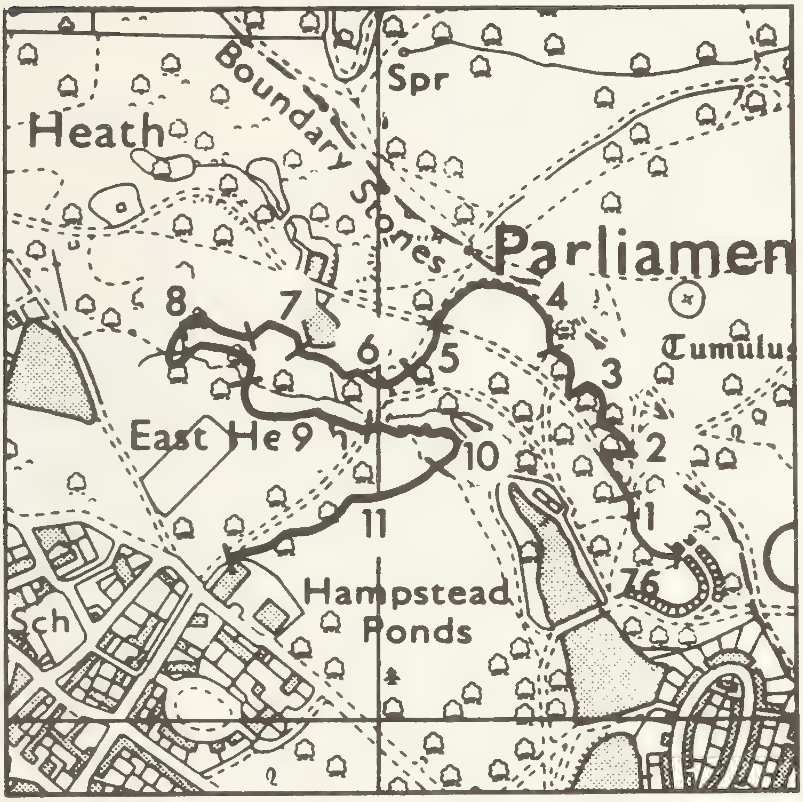
(Continued from p.92). One can hope to be more definite in detailing changes in butterfly populations. As diurnal species, butterflies are much more readily obvious and one can be more confident in stating residence or absence. The system of monitoring by transect counts produces meaningful comparative statistics of population changes and flight periods. The Hampstead Heath transect has been monitored since 1978.



The Hampstead Heath Transect

1. Scrub, rough grass
2. Scrub, edge of mown grass
3. Scrub, rough grass, wood edge
4. Scrub edge around playing field
5. Rough grass and scrub
6. Open grass, little scrub
7. Open grass
8,9. Wood edge, scrub, rough grass
10. Scrub, rough grass
11. Wood and scrub edge of meadow

0.25 km

| Section | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Large skipper | | | 4 | 1 | 1 | | 1 | 6 | 1 | 3 | 6 |
| Large white | | | 1 | | | | | 1 | | 1 | |
| Small white | 1 | | | | | | | | 1 | | |
| Green-veined white | | | 1 | | 2 | 1 | | | 1 | 3 | 2 |
| Small copper | | | | | 2 | 2 | | 2 | 1 | | 2 |
| Common blue | | | | | | | | | | 1 | |
| Small tortoiseshell | | | 2 | | 1 | | 1 | | | | |
| Peacock | | | 6 | 1 | 4 | | 2 | 4 | 4 | 1 | 1 |
| Comma | 1 | | | | | | | | | | |
| Meadow brown | 1 | | 23 | 3 | 11 | 8 | 5 | 10 | 1 | 5 | 7 |
| Year: 1983 | 3 | 0 | 37 | 5 | 21 | 11 | 9 | 23 | 9 | 14 | 18 |

The Heath has never been known for rarities and it is variations in the fortunes of the commoner species that can be recorded. In 1913 the H.S.S.

recorded species as common, fairly common, rare, and (apparently rarer than rare) only occasional. Changes in nine now common species are given:

The large skipper was unrecorded in 1913, and indeed Carter did not see it either. This is strange, as the current distribution map shows it solidly occupying southern Britain and it is stated that its range is virtually unchanged since the 1900s. However, it is also stated that this butterfly spends a considerable period of time settled on vegetation and so colonies can be overlooked. It has never struck me as an easily overlooked species, but I can believe that changes in grassland management can considerably affect its population, which has certainly varied greatly during my own observations.

In 1913 the orange-tip was thought rare. It seems to have established a fair population in recent years. The small copper, regarded then as fairly common, an accurate enough description today, does continuously vary in numbers from year to year. The holly blue was regarded as common. Today we think of it as fluctuating widely in numbers.

The small tortoiseshell was regarded as only fairly common. It does vary in numbers from year to year and, I suspect, is heavily parasitised and moves around. 1992 has produced an unprecedented number of larvae, and adults are beginning to emerge in similar numbers. The peacock, curiously, was regarded as only occasional, though there can have been no lack of nettle beds, nectar sources or hibernation sites. It is seen annually, and in 1992 it has produced many larvae on the Heath. The comma in 1913 was not known in the area at all. It now appears regularly, breeding on both nettles and elm.

The speckled wood is another species of recently expanding range. It probably arrived on the Heath in the early 1970s but did not become really common until quite suddenly in 1989, since when it has not looked back. The meadow brown was only 'fairly common' and Carter did not record it at all. On the transect count its numbers have never dropped below 18 for the year and reached 150 in 1984; another puzzle as to possible extinction and recolonisation.

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## Kelsey's Pond, Bookham Common, Surrey; a woodland pond revived.

ERIC W. GROVES

Kelsey's Pond (TQ 126571) had for many years become overshadowed by nearby oaks. Due to the decreasing amount of light reaching the surface the leaves which fell into the water were slow to decompose and made the pond distinctly acid. By the 1970s it had become so silted up that its aquatic invertebrate fauna had become reduced to chironomid larvae and a few examples of the water hog-louse Asellus aquaticus. As the water was by now so shallow, this woodland clay-pond often dried up by July. In 1990 the National Trust decided that it should be cleared out and the overshadowing oaks felled. During August of the same year the accumulated silt was extracted and the inlet channel, which led from the higher agricultural land bordering the Common into the NW corner of the pond, was also cleared and deepened. The removal of several large oaks on the southern side has allowed light to reach the pond throughout the year. With the pond's clearance there came an ideal opportunity to monitor the natural return of the water and the recolonisation of both plant and animal life.

- To be continued -

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# The London ATALANTA

1993
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THE NEWSLETTER OF THE LNHS ECOLOGY & ENTOMOLOGY SECTION - No.25 APRIL 1993

## INSECTS AS INDICATORS OF HABITAT QUALITY

### The need for recording and analysis

COLIN W. PLANT *

The LNHS has had a long association with insects and other invertebrates, being formed in 1914 by an amalgamation of the City of London Entomological and Natural History Society with the North London Natural History Society. The City of London's sister society, the 'South London', continues today as the British Entomological and Natural History Society and close links are still maintained including an annual joint meeting. The pages of our Society's journal *The London Naturalist* contain many entomological contributions, of which a selection was listed by Ashby (1990).

It seems that the present Society's principal interests do not fully reflect this long tradition. Insects are probably the most abundant form of animal life on the planet, and yet of all the groups represented in the London Area we have recorders for just a handful. The Heteroptera (true bugs, plant bugs, shield bugs, assassin bugs, water bugs etc) have been well covered over the years by Eric Groves, whose monumental work on the subject has appeared in annual parts in *The London Naturalist* . A remarkable number of species has been recorded, including some rarities. The classic paper by Cynthia Longfield on London's dragonflies and damselflies appeared in 1949 and is clearly now out of date. Stephen Brooks holds the post of Recorder for this group and his recent review (Brooks, 1989) makes excellent reading. The Orthoptera (grasshoppers, crickets and allies) are covered by Dave Martin and we look forward to reading his update of Ron Payne's paper on this subject (Payne, 1958). My own endeavours on the Lepidoptera (butterflies and moths), the Neuroptera (lacewings and allies) and selected families within the Diptera, namely the Syrphidae (hoverflies) and the larger Brachycera (soldier flies, snipe flies, horse flies and related groups) effectively complete the picture, leaving vast areas of the Class Insecta uncovered. This lack of Recorders for a large number of insect groups is emphasised by the inclusion in the programme booklet, against my own name, of an address to send records of invertebrates 'not otherwise listed'.

The question to be asked is whether or not this matters. Are there good reasons why we should want to fill these gaps? I venture to suggest that there are. I clearly remember when I was a small boy in Staffordshire in the 1950s being ridiculed for my interest in collecting wild flowers. Such was the general attitude to naturalists in those not so distant days. The only permissible natural history pursuit was collecting birds' eggs - a hobby I pursued for many years until I saw the light. How times have changed. Thanks largely to television, no longer is an interest

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* The Passmore Edwards Museum, Romford Road, Stratford, E15 4LZ

in wild flowers seen as an effeminate pastime. Correct identification of plants is the backbone of modern day selection of 'sites of nature conservation importance'; find the good habitats, using the vegetation as a guide, and you can hope to save them. But has it developed to the extent that only the vegetation matters? Entomologists have long recognised that insects too can serve as indicators of habitat quality, but it is only as recently as within about the last ten years that this notion has begun to gain acceptance within the conservation movement generally.

So is the LNHS missing out? I think it is. If insects are to be used as indicators of the better habitats then it is important to know something about the insect fauna within a reasonable geographical range of the area in which a particular species is found. Of insects not currently recorded by the LNHS, perhaps our greatest gap lies in the Coleoptera - the beetles. There are over 4000 species of beetle in Britain yet, with the exception of the annual reports from the Bookham Survey, we have no idea how many of these are in the London Area, let alone whether the presence of a particular species is important in the local or regional context. The group contains some of the most valuable habitat indicators of all, especially those which have life cycles dependent on long-dead timber. These may indicate undisturbed, and thus probably ancient, woodland habitats. Other beetles are specialists of sandy heathlands, others of very specific types of grassland. The range is almost limitless. Some of the Hymenoptera, especially ants and solitary wasps, also are valuable indicators of 'good' habitat. And there is a whole range of Diptera which I have no personal experience of identifying which are, again, indicators of old or quality habitats.

The LNHS is not essentially a conservation organisation. We deal in pure natural history and leave its application to the London Ecology Unit and the London Wildlife Trust, both of whom do an excellent job. We have become a principal supplier of biological data to these two bodies. If they want to assess the significance of a particular occurrence of a plant they will invariably look it up in Rodney Burton's *Flora of the London Area* (1983). Hopefully they will soon be able to do the same for moths using the Society's forthcoming book on the moths, with its distribution maps and categorisation of species according to status within the London Area.

The time is long overdue when we should be in a position to provide such detailed analyses of all the major invertebrate groups. The Society urgently needs Recorders for beetles, ants, bees, wasps and most of the Diptera. I would therefore like to invite anyone who is experienced enough in identification of any of these groups to contact me (tel:081-470 4525) and discuss what might be involved.

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## Kelsey's Pond, Bookham Common, Surrey; a woodland pond revived.

ERIC W. GROVES

(Continued from p.96). Kelsey's Pond is named after a farmhouse, demolished in 1960, just beyond the Common's northern boundary. My first visit to the pond after the excavation work was on 14th October, 1990. By then a very small amount of water had accumulated in a narrow channel in the middle. Although only six weeks since the work had been undertaken, seedlings of common water-starwort Callitriche stagnalis and water crowfoot Ranunculus peltatus had already germinated in quantity in the surrounding mud. By November, rainwater had collectd at the eastern and western ends, covering a total area of some twelve square metres with an approximate depth of half a metre. No aquatic invertebrates were noted to have as yet colonised this newly revived pond. December brought both rains and snow, so that by 13th January, 1991 the expanse of water had grown appreciably, covering c.60 square metres, which was all but a small area at the western end. It by now had a depth of between 0.75 and one metre at the deeper (eastern) end. The pond was frozen over but live strands of Callitriche were observed at the margins beneath the ice. In May of the same year two large patches of Ranunculus peltatus, one at each end of the pond, were present with floating leaves now at the surface supporting many stems of white flowers - a magnificent sight not seen at Kelsey's Pond for over 30 years. The seeds had lain dormant beneath the silt but had been unable to germinate until the acidic detritus had been removed and the underlying mud disturbed.

During a period of drought in the summer of 1991 the water level dropped but by 8th September had slightly risen and a few floating leaves of Potamogeton natans were now present. A male and a female of the dragonfly Aeschna cyanea were seen darting over the length of the pond, occasionally resting on the leaves of marginal clumps of the branched bur-reed Sparganium erectum and water plantain Alisma plantago-aquatica (the latter in full flower). A fallen willow which had been cut back to a half-submerged stump was now bearing new growth. Investigation for the presence of colonizing aquatic invertebrates on 13th October revealed a few examples of the false water-boatman Corixa sp., an adult water beetle Agabus sp. and a first instar larva of a damselfly (Odonata: Zygoptera). Corixa and Agabus, while not very strong fliers, occasionally take to the air and are likely to have arrived from one of the other ponds of the Common. The Odonata are stronger fliers and their territorial behaviour tends to lead to fairly rapid dispersal and the establishment of the species in fresh sites. The presence of the damselfly larva at this time would indicate that it had resulted from an egg laid earlier that summer.

By February 1992 patches consisting of leaf strands of Callitriche stagnalis and the submerged leaves of Ranunculus peltatus in the deeper water were accompanied by the floating leaves of the flote-grass Glyceria fluitans, the latter not a new arrival but a marginal species now spreading inwards to colonize the water area now available to it. In March and April the white flowers of the water crowfoot were conspicuous as in the previous year, but although the pond seemed now at a suitable stage for colonization by amphibians no tadpoles were noted. On 11th July a kingfisher was seen to fly to the pond from the surrounding woodland, perhaps not its first visit, and hover briefly in search of aquatic invertebrates. On 8th August pond skaters Gerris sp. were moving swiftly on the surface at the margin of the pond, taking tiny flies that had dropped onto the water. Leaves of least duckweed Lemna minuscula were noticed for the first time at the eastern edge of the pond. This could have been brought on the feet of a pair of mallard seen here in the spring, possibly the same birds that frequent Sheepbell Pond (c.500 metres by direct flight) which has a considerable quantity of this Lemna. Also present were c.20 adults of the fly Argyra diaphena (Diptera: Dolichopodidae) taking off and alighting on the leaves of Potamogeton on the marginal mud, their silvery abdominal hairs glinting momentarily in the sunlight.

The pond will continue to be monitored for further arrivals of both plant and animal life. Observations so far point to its earliest plant colonizers being those that had survived from seeds lying dormant in the mud for some considerable time, e.g. Ranunculus peltatus and Callitriche stagnalis; followed by those transported by birds, e.g. Lemna minuscula and possibly Potamogeton natans, either by seeds or small strands of roots. Flight had brought the first insect colonizers but freshwater molluscs had yet to appear.

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Back numbers may be had free of charge to LNHS members, whilst stocks last, on receipt of a stamped addressed envelope.

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# The London ATALANTA

THE NEWSLETTER OF THE LNHS ECOLOGY & ENTOMOLOGY SECTION - No.26 JUNE 1993

## IN THE WAKE OF THE GREAT STORMS

### Some valuable opportunities for tree research in Britain and the USA

PETER GASSON *

From a lecture at Burlington House, Piccadilly, on 8th March, 1993

The Royal Botanic Gardens at Kew and Wakehurst Place are home to many native and exotic trees, often of historical interest. Kew (including Wakehurst) is a scientific institution carrying out research on many aspects of botany and horticulture, as well as providing two beautiful gardens to visit. We have the world's largest herbarium, housing at least six million specimens; about 38,000 living plant species are grown, a seed bank holds 9,000 accessions and almost 4,000 species, and we conduct research on plant systematics, anatomy, biochemistry, cytology, molecular biology, seed physiology and micropropagation.

This article covers one aspect of the work in the Plant Anatomy Section of the Jodrell Laboratory. For many years we have received enquiries about the identity of plant fragments from various sources. These include wood samples from palaeontologists, archaeologists, furniture restorers and others, parts of leaves and stems from food and pharmaceutical companies and plant fragments suspected of poisoning animals or people. Until 1980 we identified tree roots implicated in damaging building foundations. Any plant material without flowers or fruits and needing microscopical examination for identification can end up with us.

After the summer drought in 1976 the Plant Anatomy inquiry service was inundated with tree roots for identification. A survey was carried out of the tree species implicated in causing foundation damage on shrinkable clay soils, especially London Clay, which resulted in the publication of *Tree Roots and Buildings* in 1980, now in its second edition. In 1980 we stopped identifying tree roots because commercial alternatives had become available. We continued our interest in root anatomy and published an identification manual for tree and shrub roots in September 1987. Only a month later, on 16th October 1987, the 'Great Storm' devastated much of south east England, uprooting or badly damaging about 15 million trees, 500 of them at Kew and about 20,000 at Wakehurst. Having an established interest in tree roots, we now had the unprecedented opportunity to study many root systems and collect root and trunk samples previously unavailable. Task Force Trees of the Countryside Commission asked us to survey the root systems of trees felled by the storm. We designed and interpreted the results from a questionnaire sent to interested parties, both professional arboriculturists and the public. The survey enabled us to broaden our knowledge of root systems on many different soil types, measure root depth of a large sample of trees for the first time and estimate the relative stability of particular types of tree on different soils. A similar storm in January 1990 allowed us to improve our sample sizes for some tree species, and the results of our survey and conclusions from it are published in several papers in the *Arboricultural Journal.*

The wood and root samples are now housed in the economic botany collections in the Banks Building at Kew, and duplicates have been sent to other collections in Europe and the USA. Large trunk discs have also been collected for tree ring studies. Preliminary results show that the trees at Kew can be divided into at least three categories: those that appear to have been adversely affected by the presence of a coal gas works across the river until the early 1960s, trees that were not so affected, and others with peaks and troughs in ring width probably associated with silvicultural practice. Bark and wood are also being screened by Kew's biochemists, which could lead to the discovery of chemicals with pharmaceutical or pesticidal properties.

At Kew, we have worldwide botanical interests and contacts. When the Fairchild Tropical Garden in Miami was severely damaged by Hurricane Andrew in August 1992, I was sent to help their hard-pressed staff in the salvage process. Even less is known about the root systems, wood and root anatomy of subtropical and tropical species than temperate ones. As I write, several hundred samples are being added to Kew's collections.

The information we have obtained from our work on tree roots and windblown trees is valuable for a number of reasons. People often wish to know the likely effects of growing trees near to their homes, and which species may be most safely grown nearby. We have data on the extent and depth of root systems of a wide variety of trees, which can be used to assess the risk to the tree of building work near by. We can now also give some indication of which species are wind stable on particular soil types, and those that are not. Tree ring patterns can also help to indicate which species are susceptible to adverse environmental conditions and those that are indifferent to them. In addition, the wood and root collections can be used now and in the future for anatomical and biochemical studies.

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(A selection of the above publications may be had on loan, free of charge, on application to the editorial address on page 104).

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# SURVIVAL: PROTECTIVE STRATEGIES AND DEVICES

IAN MENZIES *

From a lecture at Burlington House, Piccadilly, on 12th October 1992

Charles Darwin, searching for evidence to support the concept of Natural Selection during the middle part of the last century, was followed almost a hundred years later by the widely travelled naturalist Dr Hugh Cott. Both made important contributions to the present subject, describing the extraordinary ingenuity and range of protective adaptation. While many examples of this seem easy enough to interpret, others are difficult to explain. It must be a source of both frustration and relief to theorists that their explanations can seldom be proved or disproved with any certainty - unless they are too outrageous. The notion, for example, that the egg of Piezodorus literatus, the gorse shieldbug, had evolved to simulate a pork pie can of course immediately be dismissed; there is no obvious advantage, and the egg must have existed in its present form for a millenium or so before the pie put in an appearance. Does it therefore follow that the reverse must be nearer the truth? The present contribution cannot avoid being largely a repetition of that which is already known, as seen through the author's single-lens reflex, with comments. It is unfortunate that only the comments can be presented here.

Provision of the energy required to sustain life on this planet from a single ultimate source, initially in a form available only to organisms with photosynthetic capability, ensures that some form of predation must play a foremost part in the formulation of existing food chains. At all events, predation has become as vital for survival of the hunter as it is disastrous for the immediate future of the victim. It is only natural that both parties should be intent on their own survival, the former by achieving and the latter by frustrating this exercise. There are also acts such as taking nectar from flowers, the 'milking' of aphids and certain lycaenid larvae by ants, or the eating of fruit from plants, that appear to receive encouragement from the respective donors in return for services of pollination, protective supervision and seed dispersal. These are regarded more as business partnerships than predation; but how should herbivorous activities be regarded? Evidence of thorn and toxin suggests that many plants view the latter behaviour in a somewhat negative light.

A passive response to the threat of predation can be very practical and effective. Predators are confronted with a phenomenal array of cryptic adaptations: shape and colour are deployed to simulate the appearance of inedible materials such as rock or bark, or objects such as twigs, buds and leaves. Pattern and shading are cunningly arranged to disguise tell-tale shapes and outlines in order to conceal truth and promote deception. Fruits may also be simulated but, as illustrated by the pale green pupa of the Mediterranean butterfly Charaxes jasius, it is the unripe rather than the ripe fruit which is copied, presumably as the latter might invite the attention of birds, wasps and ants.

Ability to select a suitable resting site and manoeuvre to avoid discovery is also important. Unlike certain cephalopods and amphibians which can undergo rapid colour changes to match their surroundings, many insects and most moths need to find a resting place that they closely resemble. Evidently this vital choice is usually performed by the moths quite efficiently during darkness or, at least, in reduced illumination before daybreak. Could such selection therefore involve a sense other than vision? Occasionally a bad choice is made, as illustrated by an Indian skull moth Acherontia lachesis which chose to rest on a white-washed bungalow wall, and a privet hawkmoth Sphinx ligustri which, although selecting the traditional wooden fence post, sat in an oblique position so that the grain pattern was conspicuously interrupted.

Resting positions may also be adjusted to reduce shadows. For instance, the grayling and green hairstreak butterflies, Hipparchia semele, Callophrys rubi, are often to be seen tilting over sideways at an acute angle, wings almost flush with the resting surface, to eliminate shadow. The cone-head bush crickets Conocephalus dorsalis and discolor will scuttle round to the far side of a reed, their long legs and antennae extended behind the stem to be hidden from view; and the beetle *Crioceris asparagi* also hides as we pass the asparagus bed by crabbing round a stem in the same way.

Though it is essential to remain motionless to avoid discovery, ability to make a timely dash for safety can be helpful should need of escape arise. The curious homopteran *Ledra aurita*, like its close relative the cicada, is almost invisible when at rest on bark, but it can hop smartly and even fly off when discovered. The anthribid weevil *Platyrhinus resinosus*, also possessed of impeccable cryptic credentials, will drop abruptly from its perch on an ash log when approached too closely, to lie hidden in the undergrowth feigning death with legs retracted for several minutes. Many other insects, especially phytophagous beetles, also escape by means of a 'paralytic drop' to safety in dense undergrowth. Though lepidopterous larvae that feed on low-growing plants may also drop when disturbed, those that inhabit the foliage of trees beneath which vegetative cover is often poor are less likely to do so. The risk of being unintentionally eaten or crushed by a large herbivorous animal may explain this difference. Larvae that do habitually escape by falling from trees usually facilitate their return by dropping on a silken lifeline as spiders do.

Alternative strategies for passive defence involve the development of a protective covering, shell or exoskeleton, or acquisition of a poisonous, distasteful or otherwise repellent potential. Deterrent capacity is usually publicised by conspicuous colouration and by aggressive appearances, attitudes or sounds. Without such advertisements unfortunate accidents are apt to occur, as related in the sad story of Walker Jay, who died maintaining his right of way. He was right, dead right as he strode along, but he's just as dead as if he'd been wrong! Conspicuous bands or patches of black alternating with white, yellow, orange or red are characteristic warning colours, the signature of 'Müllerian mimicry', widely adopted by both vertebrates and invertebrates to remind others of their deterrent capacity. Many insects adopt conspicuous jewel-like metallic colouration, but it is not certain whether this has any deterrent significance.

Animal excreta are also highly favoured as models for protective emulation. Many lepidopterous larvae, for instance those of several species of swallowtail butterfly (genus *Papilio*) and dagger moths (genus *Apatele*) adopt the shape and colour of bird droppings. Phytophagous beetles of the genera *Lilioceris* (lily beetles), *Lema*, *Oulema* and *Cryptocephalus* (leaf beetles) go somewhat further, their larvae enthusiastically covering themselves with their own excrement. Female cryptocephalines construct an intricate covering of faecal material around each ovum, laying about eight 'scotch eggs' resembling miniature pine cones each day, which drop into the undergrowth. On hatching, the larvae retain and steadily enlarge this protective covering, carrying it around like a small earthenware pot. These larvae feed largely upon fallen leaves and finally close off the chamber and pupate within it. Use of the same protective chamber for egg, larva and pupa must be quite unique.

Perhaps the most intriguing protective adaptation is that referred to as 'Batesian mimicry' after Walter Bates of Amazon fame. In this case Müllerian advertisement is exploited to afford protection by species with no deterrent capacities of their own. Many good examples are available, but that provided by the death's head hawkmoth *Acherontia atropos* is most convincing. Though inconspicuous when resting on bark this magnificent if sinister insect rises up when disturbed, forewings spreading to reveal conspicuous alternating bands of black and yellow that run across the hindwing and abdomen, at the same time emitting a squeaking noise by expelling air from air-sacs. This performance combines the element of surprise with visual and auditory stimuli, familiar 'Jack-in-the-box' tactics that effectively disconcert an intruder. The appearance and behaviour of this species give the impression of a giant bee and it is interesting that this moth, with its short, thick proboscis, is often found in the vicinity of bee hives and has long been a suspected honey robber. Though the thoracic skull mark has earned it an evil reputation amongst the superstitious, the idea that this could represent a protective adaptation seems to be rather a 'pork pie' story.

- To be continued -

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# The London ATALANTA

THE NEWSLETTER OF THE LNHS ECOLOGY & ENTOMOLOGY SECTION - No.27 AUGUST 1993

## CHIRONOMIDS AND GLOBAL WARMING

### What can midges tell us about the environment?

STEPHEN BROOKS *

The eighth Annual Parmenter Lecture
given at Burlington House, Piccadilly, on 6th April, 1993

The use of pollen to reconstruct past environments is well known. However, I wish to demonstrate that we can also use the remains of chironomid midge larvae, preserved in lake sediments, for palaeoecological analysis and that this method is complementary, and in some ways superior, to palynological techniques.

The non-biting midges, the Chironomidae, are a family of Diptera, the two-winged flies. The males are characterised by their plumose antennae. There are about 5,000 species world-wide and over 500 are known from Britain. The larvae, which are aquatic, abundant and ubiquitous, are worm-like in appearance with a well-chitinised, non-retractile head capsule. They occur from the tropics to the arctic in a wide range of habitats: in flowing and standing freshwater, in damp leaf litter or moss, in saline waters and even in marine rock pools. All species pass through four larval stages but the time spent as a larva is largely temperature dependant, although the availability of food is also significant. Most temperate species are univoltine, but species in the far north may take up to seven years to complete their larval development; while small species in warmer waters can complete several generations in one year.

The most familiar chironomids are probably the blood worms (*Chironomus* species) which are often found in water butts and can be bought in pet shops as fish food. The colouration of these large red larvae, which can grow up to 30 mm, is due to the presence of haemoglobin which enables them to live in waters with very low oxygen concentrations. They therefore tend to dominate eutrophic (nutrient-rich) lakes and numbers can build up to 100,000 larvae per square metre in the bottom sediments. Another important group of chironomids is the Orthocladinae. Larvae in this subfamily rarely grow to more than a few millimetres and are often green because they feed on algae, which they scrape off the surface of stones and vegetation. They are less tolerant of low oxygen concentrations and therefore occur most plentifully in cool streams or oligotrophic (nutrient-poor) lakes. The nature of the substrate also influences the composition of the chironomid fauna, with rock and gravel substrates dominated by orthoclads and silty sediments dominated by chironomines and tanypodines.

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The Tanypodinae are large, active, free-living predatory chironomids, characterised by their pincer-like mandibles and retractile antennae. They are often red but this is from haemoglobin derived from their chironomine prey and cannot be utilised in respiration. Most of the other species of chironomids live in tubes which they construct from silk. By undulating its abdomen the larva draws a current of oxygenated water through the tube, ensuring a ready source of food in the form of suspended particles. Many species construct a web in the mouth of the tube which traps these food particles, and the larva periodically eats the entire web. Other species are detritivores, browsing on the sediments near their tube. Most of the species of Tanytarsini, characterised by their long and complex antennae, are extremely small and so can live in oligotrophic lakes where food is not plentiful.

The composition of the chironomid fauna of a waterbody will therefore be governed by a wide variety of environmental, chemical and physical parameters. By studying the changes in this fauna through time we can use chironomids to reconstruct past environments and also as proxy indicators of any changes that might have occurred in the last few decades.

Examination of a sample of lake sediment usually reveals large numbers of chironomid head capsules. These are derived from the skins the larvae shed as they develop. Because the head capsules are so heavily chitinised even samples over 10,000 years old remain in good condition. The head capsules are readily identifiable, at least to generic level, enabling ecological conclusions to be drawn about the lake in which they lived.

Chironomids have several other attributes which make them good indicators in lake sediment analysis:

1. The larvae occur in practically all aquatic habitats.

2. Of the benthic macroinvertebrates, only oligochaetes are more abundant than chironomids. However, oligochaetes are usually poorly preserved.

3. As the chironomid fauna is usually species rich (50-100 species may be present in one lake), the fauna as a whole is sensitive to environmental perturbations, since different species will respond to different factors.

4. Because of their rapid regeneration and the ability of the adults to move easily from site to site, chironomids respond quickly to changes in the environment.

5. The chironomid fauna complements data obtained from other groups, such as pollen and diatoms.

6. Chironomids are *in situ* indicators. Much of the pollen present in lake sediments is wind borne and may be blown from a considerable distance where environmental factors may be different.

Chironomids have been used to detect environmental perturbations of many kinds. With current interest in climate change, a research team in Canada led by Ian Walker has recently begun to look at the responses of chironomid faunas. My work has also centred on this aspect. By sampling in remote arctic or alpine lakes, where human influence is minimal, it can be assumed that any changes in the fauna must be climate driven.

A core sample of the lake sediment is divided into 1cm or 5mm sections. These subsamples are dated using 210Pb (for the last 150 years) or 14C for periods of known climatic fluctuations (glacial, mediaeval cold period, the last 30 years). Early results are encouraging. Chironomines and tanypodines are typical of warm waters while orthoclads and tanytarsines dominate in the cool lakes. The faunas are probably being affected by reduction in oxygen concentrations as the temperature increases and by the inability of some species to complete their development in cooler conditions. The lack of food may also be a limiting factor in cold, oligotrophic lakes.

In addition, chironomids can be used to indicate fluctuations in the trophic states of lakes. Some of my work has focused on the effects of eutrophication on English lakes caused by farm run-off and sewage pollution. Chironomids can also indicate changes in salinity and the effects of heavy metal pollution and acidification. By examining the lake sediments we can demonstrate what the chironomid faunas were like in the past so there can be no argument about the effects a particular pollutant might have had. Surprising as it may seem, the humble midge can reveal much fascinating information about the environment when questioned in the right way.

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## SURVIVAL: PROTECTIVE STRATEGIES AND DEVICES

### Part 2

IAN MENZIES *

(continued from p.104): Pretence to predatory capacity also has been exploited for Batesian purposes. The menace of well-armed jaws is well illustrated by the male stag beetle Lucanus cervus and, particularly in the Lepidoptera, conspicuous eye-marks are widely employed to simulate the stereoscopic visual apparatus of most predators. Both the peacock butterfly Nymphalis io and the eyed hawkmoth Smerinthus ocellata when disturbed will repeatedly confront the intruder with their eye-like wing markings, accompanied by 'reptilian' puffing sounds produced by rubbing forewings against hindwings. Fully grown sphingid larvae, as of the oleander Daphnis nerii and elephant hawkmoths Dielephila elpenor have paired eye-like marks on their front segments which they distend and wave from side to side when disturbed, giving a commendably snake-like impression.

Unlike the Batesian mimic, a genuine predator is usually at pains to avoid recognition, especially by concealing the eyes, teeth and claws which are the traditional tools of the trade. That notoriously sly hunter, the chameleon, combines cautious movement with an ability to change colour to match different backgrounds. It also has 'eyelids' capable of reducing the ocular aperture by sphincteric action until the eyes are barely visible. The technique was excellently demonstrated by a fledgling tawny owl Strix aluco with conspicuous 'cotton-wool' tufts of immature plumage discovered apparently asleep on a tree stump. Its head, however, was significantly facing the intruder and closer inspection showed that, although the eyelids had appeared at first to be closed, very narrow horizontal slits remained. On being approached the slits opened a fraction more and the bird, deciding that pretence to being part of a tree stump was not as successful as it had hoped, flew off at speed.

A high degree of protective adaptation is displayed by Apatura iris, the purple emperor butterfly, an insect that is most retiring and difficult to discover in all its stages. The mature butterfly has notoriously unpredictable behaviour and the early stages show remarkable simulation of the sallow leaves Salix spp upon which the larvae feed. The larval colour changes from green to a mottled grey by late autumn when the larvae usually descend to hibernate, resting upon the bark of larger branches; and then revert to bright green in the spring when the expanding leaf-buds attract their attention. The pupa is a masterpiece: green and rather flattened from side to side, its pale oblique lines convert it into a perfect sallow leaf, on the underside of which it usually hangs for about a fortnight before emerging in July. The adult insect is rendered inconspicuous by bands of contrasting colour that disguise the true outline of the closed wings when at rest amongst the foliage. If disturbed, the forewings suddenly tip forwards to reveal a prominent eye-mark, and the mottled dark brown and white pattern of the expanded wings is inconspicuous against the patches of light and shade that characterise woodland foliage in filtered sunlight. A thought-provoking habit shown by the fully grown larva is to bite through the stalk of a leaf when it has finished feeding, so that the leaf falls to the ground and does not remain as a conspicuous half-eaten advertisement for a bird or other predator. Certain other large caterpillars, for instance the lime hawkmoth *Mimas tiliae*, also do this. Such an apparently intelligent sequence is clearly beyond the larval intellect; but it is difficult to imagine quite how the process of natural selection is supposed to instil such indirectly advantageous behavioural sequences, even in the extensive period that has already been available, without the assistance of some factor capable of exerting a directional influence on mutation itself.

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## Blair's Shoulder-knot; a recent colonist

The first British example of this grey moth *Lithophane leautieri* was captured by K.G.Blair on the Isle of Wight in 1951. It is of passing interest that Blair himself did not give this moth its currently used colloquial name, instead referring to it as the Stone Pinion. There were probably several immigrations, as a result of which the moth soon became established in southern Britain. The first London Area record was from Totteridge, Herts., on 1 November 1972 (Lorimer), and in the next few years the insect appeared at Oxted, Selsdon, Addiscombe and Wimbledon - all Surrey localities - and at Orpington, Kent in 1979. Several, if not all, of these may have been primary immigrants, most notably the record from Addiscombe, which was made in the company of a single *Cyclophora puppillaria* - a known immigrant species - and the first record from Totteridge, which seems to have 'jumped' over the bulk of the London Area. The first Middlesex record appears to have been that at Pinner in 1981 (Minnion), again possibly a primary immigrant, but from that year the moth became established and commenced its spread across the London Area, helped by certain immigrations in 1985 and 1986. The moth is now established as a common resident in all the vice-county areas of London wherever mature examples grow of its recorded foodplants *Chamaecyparis lawsoniana*, x *Cupressocyparis leylandii*; and is usually abundant.

From the Society's new book : *LARGER MOTHS OF THE LONDON AREA* by Colin W. Plant.

Special introductory offer: £14.95 post free. LNHS Publication Sales, 3 Chatsworth Gardens, West Harrow, Middlesex HA2 ORS.

This A4 hardback book of over 300 pages gives detailed accounts of the distribution and occurrence of all 715 species of larger moth ever recorded in the London Area. For the first time, the distribution of resident species is shown in the form of detailed distribution maps - 523 in total. Details of flight periods and larval food plants, as recorded in the London Area, are given, together with all records of the migratory species.

A comprehensive gazetteer of the London Area will be of interest to all naturalists. Each copy includes a sheet of transparent overlays, showing county and borough boundaries, urban areas, woodland and the presence of chalk at the surface. All species are categorised according to status and distribution and national *Red Data Book* status is given for the rarer species, making the book an invaluable conservation tool for all involved in invertebrate ecology or recording.

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# The London ATALANTA

THE NEWSLETTER OF THE LNHS ECOLOGY & ENTOMOLOGY SECTION - No.28 OCTOBER 1993

## BATS TODAY

A sequel to the London Area research of 1985-87

CLIVE HERBERT*

From a lecture at Burlington House, Piccadilly, on 13th July, 1993

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Except for the mouse-eared and greater horseshoe bats, which no longer occur in the London Area, bats did not achieve legal protection until the Wildlife & Countryside Act of 1981. This legislation protected both bats and their roosts, and provided the impetus for the formation of county-based, voluntary Bat Groups. These groups quickly became an integral part of the national bat conservation efforts as they dealt, among other things, with the flood of enquiries from householders wanting advice about bats in their houses.

The London Bat Group was launched in 1985 under the leadership of Simon Mickleburgh. At the same time a two-year London Bat Project was initiated, with funding from the Fauna and Flora Preservation Society, the London Natural History Society and the former Greater London Council. This ran independently from the London Bat Group, although a large part of the survey work was carried out by group members. The results of the London Bat Project were published in two papers by Simon Mickleburgh in *The London Naturalist*: (1987) 66:41-91, (1988) 67:161-170. This major work collated all historical bat records, as well as involving new field survey work of roost sites, hibernacula and feeding areas. It forms a baseline for all future studies of the status and distribution of bats in London.

In this sequel for the period 1987-92, the recording area is changed from the LNHS Area used by Mickleburgh to that used by the London Bat Group, namely the metropolitan county of Greater London. All future distribution maps to be published by the Group will use monads (1km squares) for greater accuracy.

### Pipistrelle

This species, the most numerous bat nationally, was found by Mickleburgh to enjoy the same status in London and there has been no change during the period under discussion. Fifty-five new pipistrelle summer roosts were reported to the group up to 1992. This compares with 87 roosts known to Mickleburgh in Greater London between 1950 and 1987. In both periods, pipistrelles account for approximately 85% of all bat roosts specifically identified in Greater London. No pipistrelle hibernation sites have ever been confirmed in the county.

### Noctule

Regarded during the London Bat Project as the second most widespread species, the noctule undoubtedly still retains its position and can be found in several Inner London sites, including Hyde Park. It should be borne in mind that the noctule is a large bat which emerges early in the evening and has a distinctive sound on the bat detector. It is therefore one of the more easily identifiable bats, which may lead to better recorder coverage than other species. The London Bat Project located four roosts of this tree-dwelling species: one in each of the London boroughs of Hounslow, Haringey, Camden and Enfield. Since 1987 a further two roosts have been found in the London boroughs of Bexley and Hillingdon. Tree roosts are notoriously difficult to locate and no doubt many more await discovery. While no objective data on colonies are available, there have been recent reports from several sites of an absence, or at least reduced occurrences, of noctules. Since this species is vulnerable to tree felling operations, it may be one to monitor closely for possible future declines.

### Brown long-eared bat

Although this is generally considered to be the second commonest species in Britain, Mickleburgh was able to locate only three roosts in Greater London and received no reports of the species at feeding areas. Since 1987, brown long-eared bats have been observed in Bushy Park and five new roosts have been discovered. All these roosts are located in the outer boroughs and include eight individuals found using bat boxes in 1992 at Oak Hill Woods NR, East Barnet. This is a species likely to be under-recorded and more records will probably be forthcoming in future years from the outskirts of the county.

### Serotine

Only one new roost has been discovered up to 1992 to add to those recorded by Mickleburgh. Although a species with a largely south-eastern distribution in England, there are few records for Greater London. Serotines have recently been confirmed feeding at Barn Elms Reservoirs, so some degree of under-recording may have taken place through inexperienced observers regarding all large bats as noctules. There is an interesting record of a grounded serotine found on 27th May 1992 in York Road, Lambeth and taken to Kennington Police Station.

### Whiskered/Brandt's bat

The London Bat Project found a single Brandt's but no whiskered roosts in London. No further roosts of either species have since been discovered and the status of the sole Brandt's roost has not been monitored by the Group. An unidentified bat seen around Highgate Ponds on Hampstead Heath in June 1993 could conceivably relate to these species but sonagram print-outs of its echo-location calls were inconclusive. A record held by the Society of a whiskered bat at Winchmore Hill, N21 in 1989 has been rejected on the grounds of insufficient supporting data.

### Natterer's bat

The only recent record of this species available to Mickleburgh was a dead specimen found in Highgate Woods in 1985. Natterer's bats have not been satisfactorily confirmed again from this locality and the sole subsequent record is of a female found at Chiswick House in 1990. The importance of barns as roost sites for this species has only recently been fully appreciated. Could further attention to these sites in the outer boroughs of London yet reveal this species?

### Daubenton's bat

Few summer roosting sites are obtained of this species. Just one in Greater London was known to Mickleburgh and only a single additional roost has been discovered since 1987. There is no information available on any change in status from feeding areas in the county.

### Other species

A solitary Leisler's bat was picked up in the London Borough of Bromley in 1993. There are no records of any further species in the county up to 1992.

The future of bats in London. The threats to bats in London remain largely as described in Simon Mickleburgh's papers. For bats roosting in buildings there would seem to be no shortage of potential sites so long as owners are prepared to tolerate their presence. Bats roosting in trees face an altogether more uncertain future as landowners continue to 'manage' older trees in the name of public safety. In many of the urban and suburban parts of Greater London it will be the availability of high quality feeding areas which may determine the future of bats. There is still far too much close-mown grass in most London parks. Only by endeavouring to change public attitudes in this respect will the environment be improved to the benefit of bats. Other environmental problems, such as pollution of water courses and loss of ponds, doubtless already adversely affect bats and will continue to do so in the future unless appropriate action is taken.

These comments are habitat related. Successful conservation will, however, be influenced by a range of other factors. The first, I would propose, is the continued existence of a strong and effective London Bat Group to ensure that the specific needs of bats are always considered. This entails a Group with adequate membership and healthy finances. At present its activities are being restricted on both counts. The second need is to have a co-ordinated approach to bat work in the county. This means that standardised recording procedures should be implemented and a centralised repository of data developed. The London Bat Group has just 'gone live' with BATBASE - a computerised database of all records; but it will be some time before all the information held is entered on to the system. An example of the past lack of co-ordination concerns the proliferation of bat box schemes across the county in recent years. Whilst all of these have been undertaken with the best possible motives, in some cases little thought has been given to the future monitoring of their use and in others even the details of where boxes were installed appear to have been lost. This can only be regarded as a sad waste of valuable data and resources.

Another key to future successful bat conservation in London must be the continuation of structured survey work. Linking in with BATBASE is the Group's second major initiative - Borough Bat Plans. These will be definitive documents which will collate all bat information for each London borough into a single easily accessible publication for use by planners, local authorities and conservation organisations. Each Borough Bat Plan will incorporate all historical and recent records, as well as involving new field survey work, and will conclude with a 10-year Conservation Strategy. Borough Bat Plans for Camden, Islington and Barnet will be published in 1993 but future documents will, of course, depend on securing the necessary funds for the project.

A suggestion for winter fieldwork is for members to use their local knowledge to track down potential hibernation sites in Greater London - old air raid shelters, pillboxes, ice houses and underground sites. Please send in records of all your past bat sightings since 1987 and keep a special watch in future for bats.

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SALMON IN THE RIVER THAMES. Newsletter No.7 (August 1993) of the Thames Salmon Trust gives the latest news of the Trust's efforts to restore a self-sustaining population of salmon to the river. New salmon ladders are now in operation at Teddington, Old Windsor, Boveney, Hurley and Sonning, and between May, 1993 and the end of July 101 salmon had been confirmed. These included a good proportion of large fish returning to the river after spending two winters at sea. Members attending E. & E. Section's visit to the trap at Molesey in August, 1991 (TLA 20:80) were cordially received by Mr David Willis, NRA Fisheries Scientist, who explained the working of the trap built into the weir. By invitation of the Trust, members returned to Molesey on 7th August this year and saw four Thames salmon caught, weighed, measured, tagged and released. These weighed between 2.2 and 3.5 kg, and measured between 58 and 69 cms. LNHS member Miss Rosa Davis has assisted the establishment of a new type of fish pass, called a Larinier pass, at Boveney, near Windsor. For information about the Trust, phone Miss Lindsey Richardson on 0734 53 55 11 at Kings Meadow House, 2nd floor, Kings Meadow Road, Reading, RG1 8DQ.

# THE TRAVELS OF GILBERT WHITE

To mark the bicentenary of the death of Gilbert White in 1793

JUNE CHATFIELD *

From a lecture at Burlington House, Piccadilly, on 8th June, 1993

Gilbert White is often thought of as seldom venturing from Selborne, but examination of his journals shows that he regularly travelled around the country, and far more than most people of his time. White was born in Selborne, Hampshire at his grandfather's vicarage in 1720 but he spent the early years of his childhood at Compton in Surrey. He retained little memory of this and writes of Compton in a distant way in his Naturalist's Journal after revisiting the village in 1791. After Compton, a year was spent with his grandmother at Harting in Sussex and he was to continue an association with that county for much of his life and, in particular, visits to his aunt Rebecca Snooke in Ringer, from whom he inherited the tortoise. Journeys there on horseback are related in his journals - he recalls the South Downs, the vast flocks of sheep tended by shepherds and their trapping of wheatears. In the opening letter of his classic book, The Natural History of Selborne, White refers to the South Downs as a 'vast range of mountains'. When he was eight the family moved to Selborne to share 'The Wakes' with Gilbert's newly widowed grandmother who had moved from the vicarage. This was to become the focus of White family life.

White attended Oriel College in Oxford and after being ordained went on to work a Curacy at Swarraton in Hampshire and for a short term at Selborne. There was a return to Oxford in 1752 to the post of Junior Proctor, followed by further curacies at Durley in Hampshire and Dene in Wiltshire. In 1761 he obtained the Curacy at Farringdon, three miles north of Selborne, and could live at 'The Wakes', which he inherited in 1763. Curiously, although he was serving at Farringdon for over 20 years, there are few references to it in his journals. In 1784 he took the Curacy at Selborne, which he worked until his death in 1793.

Many of his journeys outside the Selborne area were to visit members of his family or to see friends, who were often college contemporaries. In 1745/6 he spent six months in the Cambridgeshire fens at Thorney to administer the estate of an uncle, but unfortunately this pre-dated his keeping of journals. As a young man in 1750 he visited his college friend Nathan Wells in the South Hams of Devon. There is a reference to this visit in John Mulso's letter to White of 30 August 1750, but White's side of the correspondence is lost. After a visit to the hot wells in Bristol in 1753, his travels took him north as far as Rutland to visit relatives and the Barker family at Lyndon Hall.

After declining Oriel College livings, Gilbert White took a perpetual Curacy at Moreton Pinkney, Northamptonshire, but he did not work this himself and only visited from time to time to collect his rents and dues. Moreton Pinkney is on a hill top and the village built of the warm yellow Northampton stone. It is an attractive village but White makes no reference to it in his journals. The entries in his Naturalist's Journal show regular visits to Oriel College and to Ringer, until 1780 when his aunt died. He dug up the tortoise from hibernation and brought it to Selborne, where it outlived him. Regular journeys were made to London to visit his brothers and attend scientific meetings, the details of which were described in a paper in the 1992 issue of The London Naturalist. White was prone to coach-sickness and preferred to travel on horseback. In the last few years of his life his journeys became less frequent but the world came to Selborne instead. His journals and personal correspondence record a steady flow of relatives and friends coming to stay at 'The Wakes'. The journals have been published in full and provide interesting reading to augment his timeless book The Natural History of Selborne.

White, G. 1993 Editor Colin Campbell. Passages from The Natural History of Selborne, Naturalist's Journal and other writings. Silent Books, Cambridge.

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